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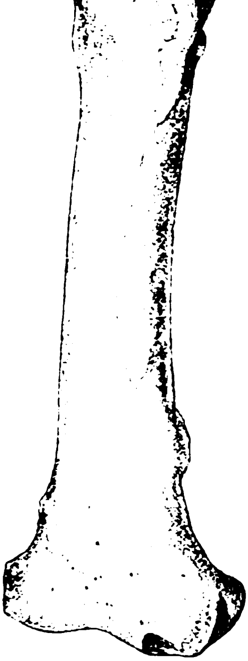

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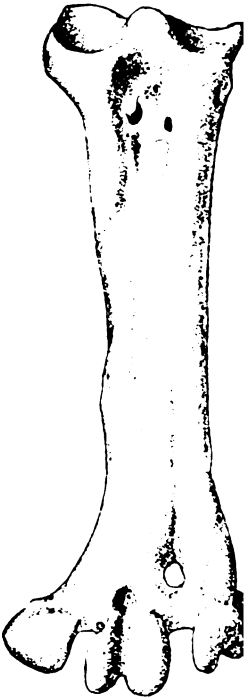

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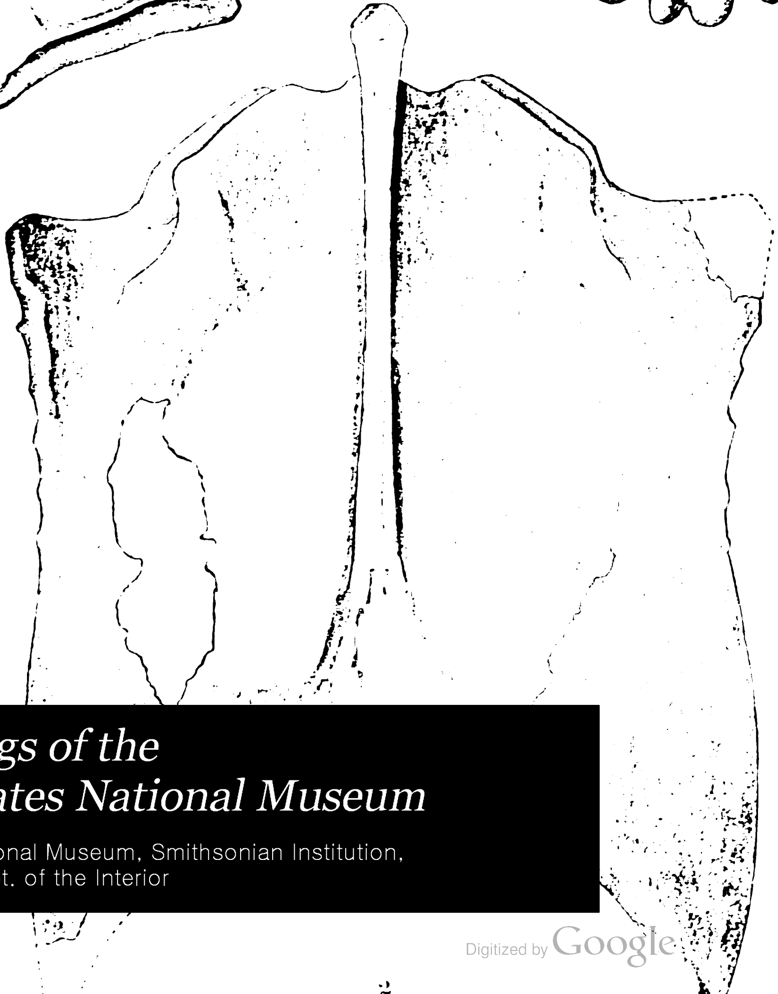

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Volume XII.

1889.

WASHINGTON:
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The extension of the scope of the National Museum during the past few years, and the activity of the collectors employed in its interest, have caused a great increase in the amount of material in its possession. Many of the objects gathered are of a novel and important character, and serve to throw a new light upon the study of nature and of man.

The importance to science of prompt publication of descriptions of this material led to the establishment, in 1878, of the present series of publications, entitled "Proceedings of the United States National Museum," the distinguishing peculiarity of which is that the papers are published in pamphlet form as fast as completed, and in advance of the bound volume. The date of publication being plainly expressed on each article the ready settlement of questions of priority is assured. The present volume constitutes the twelfth of the series.

The articles in this series consist: First, of papers prepared by the scientific corps of the National Museum; secondly, of papers by others, founded upon the collections in the National Museum; and, finally, of facts and memoranda from the correspondence of the Smithsonian Institution.

The Bulletins of the National Museum, the publication of which was commenced in 1875, consist of elaborate papers based upon the collections of the Museum, reports of expeditions, etc., while the proceedings facilitate the prompt publication of freshly-acquired facts relating to biology, anthropology, and geology, descriptions of restricted groups of animals and plants, the discussion of particular questions relative to the synonymy of species, and the diaries of minor expeditions.

Other papers, of more general popular interest, are printed in the Appendix to the Annual Report.

Papers intended for publication in the Proceedings and Bulletins of the National Museum are referred to the Committee on Publications, consisting of the following members: T. H. Bean, A. Howard Clark (editor), Otis T. Mason, John Murdoch, Leonhard Stejneger, Frederick W. True, and Lester F. Ward.

S. P. Langley,
Secretary of the Smithsonian Institution.

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LIST OF ERRATA.

Page 85. The fourth paragraph should read: Dr. Theodor Pleske kindly writes me in regard to the specimens in St. Petersburg: "Our museum possesses two excellent specimens of this species, both fully adult. One specimen was collected in Bering Island by Wrangell, the other is of unknown origin."

Page 369, line 3, for "Plates XVI, XVII" read "Plates XVIII, XIX."

Page 369, line 13, for "Plate XVIII" read "Plate XVII."

Page 369, line 34, for "Plate XIX" read "Plate XVI."

PROCEEDINGS
OF THE
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FOR THE YEAR 1889.
VOLUME XII.

A REVIEW OF THE GENUS XIPHOCOLAPTES OF LESSON.

BY
ROBERT RIDGWAY,
Curator of the Department of Birds.

Two specimens of an unknown species of this genus, from Costa Rica, having been sent to me for identification by the director of the Costa Rica National Museum, I found myself led into an investigation which, contrary to my expectation or desire, has involved a very considerable amount of labor and research. Fortunately, the National Museum collection, re-enforced by specimens in the collections of the American Museum of Natural History, in New York, the Boston Society of Natural History, and the Museum of Comparative Zoology, in Cambridge, has afforded me fair material to work upon, and my thanks are due to the officers of those institutions who have kindly placed this material in my hands for study.

Somewhat to my surprise, the existence of a much greater number of clearly-defined forms than have been recognized by leading authorities soon became apparent; and a strict regard for the principles of geographical distribution and variation has left me no other resource than to describe a considerable number as new to science, even though by so doing the number of the latter exactly equals that of those which have hitherto been recognized as valid.

Until the two Costa Rican specimens above mentioned were obtained no representative of the genus was known to occur in any portion of the continent lying between Guatemala and the interior of Colombia, and there are still extensive regions in South America of which the same may still be said. Consequently, it is quite certain that when more extensive collections have been made in those regions and the birds of other portions of the "great bird continent" are better known, the number of forms will be considerably further increased.

It is also very likely that more material will show that several of the forms now ranked as distinct species actually intergrade, thus being entitled only to trinomial instead of binomial appellations.

Genus Xiphocolaptes Lesson.

Xiphocolaptes Less., Rev. Zool., 1840, 269 (type, *Dendrocopus albicollis* Vieill.).—Cab. & Heine, Mus. Hein., II, 1859, 35, 36.—Scl., Cat. Am. B., 1861, 163, 164 (excl. *X. perrotii*,=*Dendrexetastes perrotii*).—Scl. & Salv., Nom. Neotr., 1873, 68.
Dendrocolaptes (part) Lafr., Rev. et Mag. Zool., 1850, 98-104.
"*Dendrocopus* Rchb., 1853 (*nec* Vieill., 1815)."

Gen. Char.—Size, largest of the family, except genera *Nasica** and *Drymornis*† (total length about 11.00-13.00, wing 4.70-6.00); bill, from rictus, nearly twice the length of the tarsus, slightly curved, much compressed; tarsus longer than middle toe, the outer toe equal to the middle; wing longer than tail, third to sixth quill longest (fourth or fifth a little longer than third and sixth), the primaries exceeding the secondaries by much less than length of tarsus; tail graduated, the feathers hard, with very rigid, sharp-pointed shafts. Color: Remiges and rectrices chestnut or cinnamon-rufous, the inner webs of longer primaries tipped with dusky; rest of plumage brownish (chiefly cinnamon-rufous in *X. major*), the breast, etc., with more or less distinct streaks of paler, the pileum and hind-neck (rarely the back) usually also streaked.

The genera most nearly allied to *Xiphocolaptes* are *Nasica* Lesson, *Dendrexetastes* Eyton,‡ and *Dendrocolaptes* Heermann.§ They are all readily distinguished, however, by the following characters:

a^1. Bill much compressed, its width at gonydeal angle little if any more than half its height at same place.
  b^1. Bill extremely long, its length from nostril more than twice the length of the tarsus .... *Nasica*.
  b^2. Bill moderately long, its length from nostril less than one and a half times the length of the tarsus .... *Xiphocolaptes*.
a^2. Bill not compressed, its width at gonydeal angle nearly equal to its height at same place.
  b^1. Bill from nostril longer than tarsus .... *Dendrocolaptes*.
  b^2. Bill from nostril not longer than tarsus .... *Dendrexetastes*.

Hab.—Southern Mexico to Argentine Republic, Paraguay, and Peru.

KEY TO SPECIES.

(Omitting those which I have not seen, excepting *X. simpliciceps* Lafr.)

a^1. Back and scapulars brown, very different from the cinnamon-rufous or chestnut of remiges and tail.
  b^1. Pileum and hind neck streaked with paler.
    c^1. Pileum and hind neck sharply (though sometimes very narrowly) streaked, the ground color more or less darker than the back.

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* *Nasica* Less., Traité, I, 1831, 311 (type, *N. nasalis* Less.,=*Dendrocolaptes longirostris* Licht.).

† *Drymornis* Eyton, Jardine's Contr. Orn., 1852, 23 (type, *D. bridgesii* Eyt.).

‡ *Dendrexetastes* Eyt., Jardine's Contr. Orn., 1851, 76 (type, *D. capitoides* Eyt.,=*Dendrocolaptes temmincki* Lafr.).

§ *Dendrocolaptes* Heerm., Obs. Zool., 1804, 135 (type, *Picus certhia* Bodd.).

d^1. Belly and under tail-coverts distinctly barred with dusky.

e^1. Bars on belly, etc., very distinct and continuous; pileum black, broadly streaked; tail dark chestnut. *Hab.*, Brazil.
X. albicollis (VIEILL.) (p. 3).

e^2. Bars on belly, etc., less distinct, in places more or less concealed or interrupted; pileum dusky brown, narrowly streaked; tail clear chestnut. *Hab.*, Southern Mexico .... *X. sclateri* RIDGW. (p. 6).

d^2. Belly and under tail-coverts not distinctly barred with dusky.

e^1. Middle of belly with very faint bars or transverse spots.

f^1. Breast very narrowly streaked. *Hab.* Guatemala.
X. emigrans SCL. (p. 7).

f^2. Breast broadly streaked. *Hab.* Costa Rica.
X. emigrans costaricensis RIDGW. (p. 8).

e^2. Whole belly spotted with black (the spots in two rows on each feather, separated by a more or less distinct buffy streak).

f^1. Pileum broadly streaked (streaks much broader than shafts of the feathers).

g^1. Brown of lower parts, back, etc., of a ruddy or tawny hue; bill slender, blackish; wing-coverts without streaks. *Hab.* Colombia.
X. promeropirhynchus, LESS. (p. 10).

g^2. Brown of lower parts, back, etc., of an olive hue; bill stouter, light horn-color; lesser and middle wing-coverts streaked with buff. *Hab.* unknown .... *X. virgatus* RIDGW. (p. 11).

f^2. Pileum very narrowly streaked (streaks nearly or quite confined to the shafts).

g^1. Rusty-brown above, tawny-brown below, the tail clear rufous, like wings. *Hab.* Ecuador .... *X. ignotus* RIDGW. (p. 13).

g^2. Rich umber-brown above and below; tail very dark chestnut, much darker than deep chestnut wings. *Hab.* Ecuador to Peru.
X. compressirostris TACZAN. (p. 18).

c^2. Pileum indistinctly streaked, and not darker than back. (Pileum and back cinnamon-brown, the former narrowly and indistinctly streaked with pale cinnamon or rusty buff; beneath pale wood-brown, streaked with light buff.) *Hab.* Northeastern Brazil (Bahia).
X. cinnamomeus RIDGW. (p. 15).

b^1. Pileum and hind-neck without streaks (otherwise much like *X. compressirostris*). *Hab.* Bolivia .... *X. simpliciceps* LAFR. (p. 13).

a^2. Back and scapulars bright cinnamon-rufous, like wings and tail.

b^1. Beneath pale cinnamon, with broader buffy streaks, the throat much paler; under tail-coverts light cinnamon-rufous; above cinnamon-rufous. *Hab.* Paraguay and Argentine Republic .... *X. major* VIEILL. (p. 16).

b^2. Beneath deep cinnamon-rusty, with much narrower buffy streaks, the throat much duller but scarcely paler; under tail-coverts bright chestnut; upper parts bright chestnut. *Hab.* Bolivia .... *X. major castaneus* RIDGW. (p. 17).

Xiphocolaptes albicollis (VIEILL.).

Dendrocopus albicollis VIEILL., Nouv. Dict., XXVI, 1818, 117; Enc. Méth., 1823, 625 (Brazil).—REICH., Handb., I, 1850, 189, pl. 539, fig. 3692.

Dendrocolaptes albicollis GRAY, Gen. B., I, 1849, 140.—BONAP., Consp., I, 1850, 287.—LAFR., Rev. et Mag. Zool., 1850, 98.

Xiphocolaptes albicollis CAB. & HEINE, Mus. Hein., II, 1859, 36 (Brazil).—SCL., Ibis, 1859, 118; Cat. Am. B., 1861, 163 (S. E. Brazil).—SCL. & SALV., Ex. Orn., I, 1869, 72; Nom. Neotr., 1873, 63.—VON BERL., J. f. O., 1873, 253 (Sta. Catarina).—WHITE, P. Z. S., 1882, 613 (Misiones, Arg. Rep.).—VON BERL & VON JAERING, Zeitschr. für Orn., 1885, 146 (Taquara and Arroio Grande, Prov. Rio Grande do Sul).—SCL. & HUDSON, Arg. Orn., I, 1888, 200 (Misiones).

Dendrocolaptes decumanus LICHT., Abh. Ak. Berl., 1820, 256, pl. 1, fig. 1; Verz. Doubl., 1823, 16.—SPIX, Av. Bras., I, 1824, 86, pl. 87 (Arapacu).—BURM., Syst. Ueb., III, 1856, 10.

Xiphocolaptes decumanus LESS., Rev. Zool., 1840, 269.

Dendrocolaptes crassirostris SUCH, Zool. Jour., 1826, II, 115.

Dendrocops crassirostris LAFR., Rev. et Mag. Zool., 1851, 325.

Dendrocolaptes guttatus MAX., Beitr., III, 1831, 1120 (Rio de Janeiro, Capo Frio, and Espiritu Santo; *nec* LICHT.).

HAB.—Eastern Brazil, north to Bahia, south to northern portion of Argentine Republic (Misiones, etc.).

SP. CHAR.—Pileum and hind-neck black, rather broadly streaked with buff; whole belly, thighs, anal region, and under tail-coverts distinctly and regularly barred with blackish; chin and nearly whole throat white or pale buff; tail dark or dull chestnut, contrasting with color of upper tail-coverts.

Adult (No. 36770, Rio de Janeiro, Brazil; Natural History Museum of Rio).—Pileum and hind-neck black, broadly streaked with buff, some of the streaks of guttate form; back and scapulars raw-umber, outer surface of closed wings similar, but browner (nearly a mummy-brown hue); upper back narrowly streaked with buff; lower back tawny brown or mummy brown, deepening into rusty chestnut on rump and upper tail-coverts; tail dark chestnut, the shafts still darker; inner webs of remiges clear light chestnut, the terminal portion, however, dusky. Lores, suborbital region, ear-coverts, and narrow superciliary stripe pale buff, narrowly and indistinctly streaked (except the first) with dusky; upper portion of auricular region blackish, streaked with buff, forming a broken postocular stripe; malar region brownish black, marked with guttate spots or streaks of buff. Chin and throat plain buffy white; rest of under parts light raw-umber, tinged with tawny, brighter and deeper on sides and flanks, paler and more tawny on belly, thighs, anal region, and under tail-coverts (the latter more rusty), which are distinctly and regularly barred with blackish; chest, breast, and sides narrowly striped with pale dull buff, the streaks becoming much narrower posteriorly, those along the median line, quite to the white of the throat, margined with small dusky-brown spots. Under wing coverts pale tawny or light ochraceous, barred with black. Upper mandible brownish black; lower mandible brownish in middle portion, dark grayish basally, blackish at tip and horn-whitish on gonys; legs and feet olive-dusky. Length (skin), 11.90; wing, 5.30; tail, 5.10; culmen, 2.10; depth of bill at angle of gonys, .40; tarsus, 1.22; middle toe, 1.00.

Young.—According to Count von Berlepsch (*l. c.*), the young have shorter bills and broad rusty yellow guttate spots, instead of streaks, on the top of the head.

Among the eight adult examples of this species which have been examined in connection with the present review, are some notable variations of color, correlated with difference of locality, which if shared by additional specimens would necessitate the recognition of at least two geographical races in addition to the typical form. The specimens examined are as follows:

a. No. 36770, U. S. Nat. Mus., Rio de Janeiro; Natural History Museum of Rio
b. No. 36769, U. S. Nat. Mus., Rio de Janeiro; Natural History Museum of Rio.
c. No. 24016, U. S. Nat. Mus., "South America (Cruise of the *Delaware*) Dr. G. R. Horner."
d. No. 24035, U. S. Nat. Mus., Sta. Catarina; Lemuel Wells.
e. No. 116630, U. S. Nat. Mus., Sta. Catarina; Lemuel Wells.
f. No. 14726, U. S. Nat. Mus., Buenos Ayres; J. K. Townsend.
g. No. 17966, Mus. Comp. Zoology, Thayer expedition. (Locality not given.)
h. No. ———, Am. Mus. Nat. Hist., "Brazil?"; Lawrence collection.

Specimens *a*, *b*, *c*, and *h* are typical *X. albicollis*, having the rump and upper tail-coverts rusty-chestnut (the lower back, even, tinged with the same), and the under surface strongly tinged with tawny.

Specimens *d* and *e* (from Sta. Catarina) have the rump and upper tail-coverts olivaceous-russet, only slightly tinged with rusty (this tinge confined to upper tail-coverts in specimen *d*), the under parts much less tawny, the buffy streaks on pileum slightly narrower and paler, and the bill decidedly smaller and more slender, and uniform brownish black in color, instead of having the under mandible (and sometimes terminal portion of the upper) mostly horn-colored.

Specimen *g* is nearly intermediate, having the more tawny under parts of true *X. albicollis*, the small, slender, wholly black bill of Sta. Catarina specimens, and the color of the rump and upper tail-coverts intermediate between the two, or russet, becoming deeper on upper tail-coverts.

Specimen *f* (from Buenos Ayres) is particularly different in color from true *X. albicollis*, and unless the peculiar coloration may be due, more or less, to exposure to the light (it having been mounted for many years) is different enough to be considered specifically distinct. The ground color of the pileum and hind-neck, instead of being black is dull sepia-brown, with the streaks dull buffy-whitish; the back, scapulars, and almost the whole of the outer surface of the closed wing are dull grayish-brown or pale sepia, the lower back, rump, and upper tail-coverts browner, but not approaching rusty, though the upper tail-coverts have a tinge of light Mars-brown. The tail and the inner webs of the remiges are dull chestnut, much lighter as well as duller than in typical *X. albicollis;* the ground color of the under parts of the body is light grayish-brown or broccoli-brown, the streaks dull whitish. Should other examples from Buenos Ayres prove to be similar to this one, I propose that the bird be called *Xiphocolaptes argentinus* or *X. albicollis argentinus.*

The measurements of these specimens are as follows:

	Total length.	Wing.	Tail.	Cul-men.	Depth of bill.	Tarsus.	Mid. toe.	
a.	12.10	5.30	5.20	2.00	.42	1.22	1.02	
b.	11.90	5.30	5.10	2.10	.40	1.22	1.00	
c.	....	5.20	5.00	......	....	1.25	1.02	**Bill broken off near base.**
d.	11.50	4.70	4.50	2.05	.32	1.20	1.08	
e.	11.20	5.05	4.55	1.95	.35	1.18	1.05	
f.	(11.50)	5.30	....	2.08	.38	....	...	**Middle tail-feathers wanting.**
g.	11.75	5.20	5.05	2.03	.40	1.23	1.05	
h.	12.40	5.30	4.90	2.18	.38	1.18	1.05	

It will thus be seen that not only do the two Sta. Catarina specimens (*d* and *e*) have smaller or more slender bills, but they also have shorter wings and tails than those from other localities.

Xiphocolaptes sclateri, sp. nov.

"*Xiphocolaptes albicollis* (VIEILL.)?" SCL., P. Z. S., 1857, 202 (vicinity of Jalapa).

Xiphocolaptes emigrans (part) SCL., Ibis, 1859, 118 (Jalapa).—SCL. & SALV., EX. ORN., pt. v, December, 1867, 69 (part).—SUMICHR., Mem. Bost. Soc., I, 1869, 554 (Vera Cruz).

SP. CHAR.—Similar to *X. albicollis* (Vieill.), but larger, with longer bill, narrower streaks on pileum and hind neck, and less distinct bars on abdomen.

HAB.—Southeastern Mexico (mountains of Vera Cruz).

Adult (type, No. 37442, Orizaba, Mexico; Prof. F. Sumichrast).—Pileum brownish black, each feather with a sharply-defined narrow mesial streak of pale buff; hind-neck, back, and scapulars olive-brown, the first streaked like the pileum, the upper back with much narrower streaks or shaft-lines; rump and upper tail-coverts bright cinnamon-rufous, the lower back tinged with the same; wings slightly paler cinnamon-rufous, the exposed portion of the coverts mostly light olive-brown, the primaries and secondaries indistinctly edged with the same; tail clear chestnut, with shafts of the feathers mostly dusky. Sides of head streaked with dark olive-brown and pale buffy, the latter prevailing on superciliary and orbital regions and ear-coverts, the former on upper portion of ear-coverts and on malar region. Chin and upper throat buffy white, deepening into light buff on lower throat; foreneck, sides of neck, chest, and breast light olive-brown, inclining to raw-umber, each feather marked with a distinct mesial streak of buffy whitish; sides and flanks raw-umber, tinged with cinnamon-tawny, the first with very narrow paler streaks; belly and under tail-coverts light olive-tawny, barred or transversely spotted with dusky, the feathers with very fine paler shaft-streaks; axillars and under wing-coverts ochraceous, barred with dusky. Upper mandible dark horn-color, lower bluish dusky (plumbeous in life?); legs and feet greenish dusky (dark olive in life?). Length (skin), 12.50; wing, 5.60; tail, 5.60; culmen, 2.30; depth of bill at angle, .40; tarsus, 1.30; middle toe, 1.12.

An adult from Orizaba in the collection of the Museum of Comparative Zoology, Cambridge, Massachusetts (No. 31837), is like the one described above, but is slightly more olivaceous beneath, the upper belly somewhat tinged with tawny, and the outer surface of the remiges (except tertials) more strongly washed with brown. The bill is also somewhat paler, being tinged with horn-whitish on terminal portion of the culmen, and on the gonys. Length (skin), 13.00; wing, 5.55; tail, 5.30; culmen, 2.35; depth of bill at angle, .40; tarsus, 1.32; middle toe, 1.12.

I am less surprised that this very distinct species should have been at first referred to *X. albicollis* than that it could afterwards have been considered the same as the Guatemalan *X. emigrans*.

Xiphocolaptes emigrans SCL.

Xiphocolaptes emigrans SCL., Ibis, April, 1859, 118, 127 (Guatemala); Cat. Am. B., 1861, 163.—CAB. & HEINE, Mus. Hein., II, 1859, 36.—SCL. & SALV., Ex. Orn., I, 1869, pl. 35 (part; Guatemala); Nom. Neotr., 1873, 68 (part).

SP. CHAR.—Pileum bistre-brown, narrowly streaked with pale buffy; lower parts raw-umber, the belly without distinct markings, the throat striped with pale buff or dull buffy white, and chest very narrowly streaked with the same; malar region dark bistre, narrowly streaked with pale tawny.

HAB.—Guatemala.

Adult (Lawrence collection, Am. Mus. Nat. Hist., Guatemala; J. G. Bell).—Pileum dark bistre, each feather with a narrow mesial streak of pale buffy; hind-neck similar, but paler brown, with still narrower streaks; back and scapulars plain brown (intermediate between bistre and mummy brown), the wing-coverts similar, but tinged with rusty, the inner web of greater and primary coverts rusty chestnut; remiges clear chestnut, the outer web of primaries mostly light mummy brown, and terminal portion of inner web of five outer quills dusky; lower back, rump, and upper tail-coverts rusty chestnut; tail deep chestnut, with shafts darker (dusky on middle feathers except toward tips). Lores dull brownish whitish; superciliary region broadly streaked with pale dull buffy; suborbital region and auriculars (except along upper margin) dull brownish whitish streaked with dark brown; malar region deep bistre, narrowly streaked with pale tawny. Chin brownish white or pale dull buffy tinged with brown; upper throat similar, broadly streaked or striped with raw umber; rest of lower parts raw-umber brown, the lower throat broadly and chest narrowly streaked with pale buffy, the breast and anterior portion of sides with very narrow shaft-streaks of the same; belly, anal region, and under tail-coverts marked with small, indistinct, transverse spots of grayish brown; axillars and under wing-coverts pale tawny or ochraceous barred or transversely spotted with blackish brown. Bill horn-color, paler on terminal half of upper mandible, the basal half of lower mandible grayish or bluish horn-color; feet greenish horn-color, the claws pale brownish. Length (skin), 10.60; wing, 5.50; tail, 5.00; culmen, 2.10; depth of bill at gonydeal angle, .40; tarsus, 1.18; middle toe, 1.05.

Xiphocolaptes emigrans costaricensis Ridgw.

Xiphocolaptes emigrans costaricensis Ridgw., Proc. U. S. Nat. Mus., xi, 1889, 541.

Subsp. Char.—Similar to *X. emigrans* Scl., from Guatemala, but slightly larger, and with streaks on breast, etc., broader.

Hab.—Costa Rica (Naranjo, Cartago).

Adult male (type, No. 115041, U. S. Nat. Mus., Naranjo, Cartago, Costa Rica, August, 1886, J. C. Zeledon).—Pileum dusky sepia brown, each feather with a very distinct mesial streak of pale dull buffy, the ground color gradually changing on occiput, hind-neck and back into raw-umber, tinged with rusty, the streaks at the same time becoming narrower until they disappear altogether about the middle of the upper back; lower back, rump, and upper tail-coverts light reddish chestnut; remiges and rectrices rather deeper, or clear chestnut, the shafts of the latter becoming blackish basally; wing-coverts and outer webs of primaries and their coverts light raw-umber. Sides of head streaked with pale dull buffy and dark sepia, the latter prevailing on malar region, the former immediately above, forming two ill-defined, rather broad, stripes; chin and upper throat plain pale dull buffy; rest of lower parts raw-umber, tinged with rusty or tawny, the chest, upper breast, and sides of neck rather broadly and very distinctly streaked with very pale buffy, the other lower parts much more narrowly and indistinctly streaked with the same; middle portion of lower belly marked with a few transverse spots of blackish, arranged transversely, but not forming continuous bars; under wing-coverts light ochraceous, transversely spotted with blackish, these spots on both webs of the feathers, but those of opposite webs separated by a median space of ochraceous. Bill light grayish horn-color, darker basally; feet dusky horn-color; "iris dark." Length (skin), 10.90; wing (quills worn at tips and some of them moulting), 5.70; tail (middle feathers not full grown), 5.10; culmen, 2.20; bill from nostril, 1.53; depth at angle of gonys, .40; tarsus, 1.30.

Immature female (No. 2006, coll. Costa Rica National Museum, same locality, etc.).—Pileum dull black, changing to bistre-brown on occiput, each feather marked with a distinct mesial streak of pale brownish buff; hind-neck and upper back lighter and clearer brown* than occiput, but similarly streaked, though the streaks become much narrower on the back; scapulars and lesser wing-coverts similar in color to the back, but without streaks; middle and greater coverts similar, but tinged with rusty; remiges clear, rather light, chestnut, the primaries edged with light bistre; primary coverts light bistre, with median portion chestnut; lower back, rump, and upper tail-coverts bright reddish chestnut; tail clear chestnut, with shafts becoming blackish basally. Sides of head streaked with dark bistre and light dull buffy, the latter prevailing on orbital region and ear-coverts, the former on malar region; chin and upper throat plain pale grayish buffy, the lower throat similar but indistinctly spotted or mottled with brownish; sides of neck, chest, and under parts generally, raw-umber, more rufescent on sides and lower tail-coverts; sides of neck narrowly streaked with pale brownish buffy; chest and upper breast broadly streaked with a paler and duller tint of the same, each streak margined laterally by a narrower dusky streak; lower breast and belly with similar but much narrower and less distinct streaks, the middle and lower portion of the latter marked with small transverse spots of dusky, in transverse series, but not forming continuous bars; under tail-coverts very indistinctly streaked with paler and faintly spotted with dusky. Bill horn-color, feet dusky, "iris dark." Length (skin), 11.75; wing, 5.50; tail, 5.30; culmen, 1.90.

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* Intermediate between the bistre and mummy-brown of my "Nomenclature of Colors."

Compared with a typical example of *X. emigrans* Scl., from Guatemala (in the Lawrence collection, American Museum Nat. Hist.), the resemblance is so very close as to leave no doubt as to their specific identity, such differences as are observable being not more than sufficient to characterize a local race. These consist, in addition to those mentioned in the diagnosis, in the longer, rather narrower bill (culmen 2.20 instead of 2.10, depth at gonydeal angle .40 instead of .42), longer wing (5.70 instead of 5.45) and tail (5.10 instead of 4.85), much broader streaks on chest, etc., and absence of distinct brown stripes on the throat.

When the two specimens described above were first received I was able to compare them only with two specimens of so-called *X. emigrans* from Southern Mexico (Jalapa), from which they were so very different that I considered them specifically distinct. At the same time I was greatly puzzled by several very marked discrepancies between Mr. Sclater's (and other) descriptions of *X. emigrans* and the characters of the Orizaba specimens, the latter having the belly distinctly barred with dusky instead of having this feature entirely absent, the tail 4.70 to 5.00 inches (measured from insertion of the middle feathers) instead of 4.50, and the bill mainly dusky instead of "a dirty horn-colored white." The matter was quite cleared up, however, when I received (from the authorities of the American Museum, in New York) a specimen of the true *X. emigrans*, from Guatemala, agreeing entirely with Dr. Sclater's description, and so different from all Mexican examples I have seen that I can not avoid considering them specifically distinct.*

The immature bird described above, with its rather darker colors, smaller and darker bill, and dusky margins to the pale buffy streaks on the breast, etc., presents a rather close general resemblance to *X. promeropirhynchus*, from Colombia, four specimens of which are now before me. But the bill is much deeper, as well as less curved, the rump much more extensively chestnut, the throat whiter, and the belly much less distinctly spotted. The adult does not at all resemble *X. promeropirhynchus*.*

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* *X sclateri*, sp. nov., described on pp. 6–7.

Xiphocolaptes promeropirhynchus (LESS.).

Dendrocolaptes promeropirhynchus (LESS.), Rev. Zool., 1840, 270.—LAFR., Rev. et Mag. Zool., 1850, 99 (Colombia).—SCL., P. Z. S., 1855, 142 (Bogota).

Dendrocoptes promeropirhynchus REICH., Handb., I, 1850, 190, pl. 536, fig. 3678.

Xiphocolaptes promeropirhynchus CAB. & HEINE, Mus. Hein., II, 1859, 36 (New Granada).—SCL., Cat. Am. B., 1861, 163 (Bogota).—SCL. & SALV., Ex. Orn., I, 1869, 72 (part); Nom. Neotr., 1873, 68 (part).

Picolaptes promeropirhynchus GRAY, Gen. B., I, 1840, 140.

SP. CHAR.—Pileum bistre-brown, very narrowly streaked with light tawny; chin and throat dull light tawny or brownish-buff; rest of under parts raw umber-brown, broadly streaked with brownish-buff or light tawny, these streaks usually (?) with indistinct dusky margins; belly brownish-tawny, streaked with paler, and spotted with dusky. Bill dusky, smaller than in any other member of the genus (culmen not more than 2.00, usually much less).

HAB.—Colombia (vicinity of Bogota).

Adult (No. 88457, Bogota; obtained from Count von Berlepsch).—Pileum deep bistre, this color gradually fading on hind-neck, back, scapulars, and lesser and middle wing-coverts into raw-umber brown, with a slight tawny tinge, the pileum and hind-neck very narrowly streaked with buff, the upper portion of the back with still narrower streaks of the same; lower back russet, deepening into chestnut on rump and upper tail-coverts; tail deep chestnut, the shafts brighter or redder, becoming darker basally; outer webs of greater and primary wing-coverts tawny brown or raw-umber, like back, their inner webs chestnut (a little lighter than tail), the outer webs of exterior primaries inclining to raw-umber, the terminal portion of inner webs of seven outer quills dusky brown. Lores, suborbital region, and auriculars buff, the latter sparsely streaked with dark brown, this more extended along upper portion, producing an indistinct postocular stripe, bordered above by a stripe of broad buff streaks; malar region dark bistre marked with guttate streaks of buff. Chin dull brownish-white, deepening into brownish-buff on throat; rest of under parts raw-umber, becoming paler and more tawny on belly; the chest, breast, and anterior portion of sides rather broadly streaked† with buff, the belly with wider but less sharply defined serrated streaks margined on each side by a row of dusky spots; under tail-coverts mummy-brown, with pale tawny shaft-streaks; axillars and under wing-coverts tawny ochraceous, spotted with dusky. Bill blackish, horn-color, feet grayish-black. Length (skin), 10.50; wing, 5.60; tail, 5.50; culmen, 1.80; depth of bill at gonydeal angle, .35; tarsus, 1.27; middle toe, 1.10.

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* The young specimen was at first, before the description was published, made the type, on account of its fresher plumage. It was sent for examination to Dr. Sclater, who returned it with the observation that it was the same as *X. promeropirhynchus*. Had he seen the adult specimen, however, I am sure he would not have made this mistake.

† Streaks about .08 wide anteriorly, but much narrower posteriorly and reduced to mere shaft-lines on sides.

Three adults from Bogota in the collection of the American Museum of Natural History (Lawrence collection) are essentially similar, but have the streaks on lower parts broader and extending quite to the belly and flanks, and indistinctly margined along each side with dusky; the belly more heavily spotted with dusky or blackish; two of them having the under tail-coverts spotted.

They measure as follows:

	Total length.*	Wings.	Tail.	Culmen.	Depth of bill at angle.	Tarsus.	Middle toe.
a.	10.30	5.70	5.50	2.00	.35	1.27	1.03
b.	9.70	5.35	5.15	1.75	....	1.25	1.00
c.	10.60	5.60	5.25	2.00	.37	1.25	1.10

This species may very readily be distinguished from its allies by the very small, dark-colored bill (smaller than in any other member of the genus), and from all except *X. compressirostris* Taczan., by the very deep coloration, with distinctly spotted belly. All the skins examined are of the well-known "Bogota" make.

It is hardly possible to determine from the description (Rev. Zool., 1840, 270†) what species Lesson intended to describe under the name *Dendrocolaptes promeropirhynchus*, the uncertainty being rendered still greater by the fact that he gave no locality. Lafresnaye, however, re-described the species (Rev. et Mag. de Zool., 1850, pp. 99, 100), and assigned to it the habitat "Colombia" ("satis frequens"); and, presuming that he had examined Lesson's type, I follow the general custom of identifying Lesson's name with the Bogota bird.

Xiphocolaptes virgatus, sp. nov.

SP. CHAR.—Most like *X. promeropirhynchus* (Less.), but paler and grayer on anterior upper parts, the back conspicuously streaked with pale buffy; under parts much less tawny, with stripes broader; bill stouter, light grayish horn-color, dusky only at base.

HAB.—Unknown.

Adult (type in Coll. Am. Mus. Nat. Hist., without number, locality, or other data).—Pileum dull, dusky olive or olive-bistre, distinctly streaked with pale buffy (streaks about as wide as in *X. promeropirhynchus*); hind-neck and back light olive-brown, narrowly but very distinctly streaked with pale buffy; lesser and middle wing-coverts and anterior scapulars similar, but the more anterior lesser coverts tinged with rusty; posterior scapulars, greater and primary coverts, and lower back plain raw-umber brown, becoming more russet posteriorly, the rump and upper tail-coverts inclining to rusty chestnut; tail chestnut (lighter than in *X. promeropirhynchus*), with shafts becoming blackish in middle portion; remiges and inner webs of primary and greater coverts dull cinnamon-rufous or light chestnut (much less bright than in *X. promeropirhynchus*), the outer webs of secondaries and five or six outer primaries washed or overlaid on edges with light raw-umber (appearing nearly uniform on the closed wing); inner webs of primaries dusky at tips, this color extending for about 1.50 inches on second quill, from which gradually but decidedly decreasing in extent toward innermost quill. Band on side of head from (and including) lores beneath eyes and across lower half of auriculars light buff, the posterior portion sparsely streaked with dusky; upper portion of ear-coverts more broadly streaked with dusky, forming a broken postocular stripe; above this a stripe of pale buff extending from above the eyes to the occiput, broken by a few narrow, dusky streaks; malar region dusky brown, marked with longitudinal broad spots or streaks of light buff. Chin and upper throat pale buff, the latter with several dashes or irregular streaks of light olive-brown; fore-neck and sides of neck light olive-brown, broadly streaked with pale buff, the streaks on fore-neck margined laterally with dusky; chest, breast, and sides colored and marked like the fore-neck, but buff streaks broader (averaging about .15 of an inch) and more distinctly margined with blackish; flanks raw-umber brown, less distinctly streaked; belly tawny-brown, marked with broad, serrated streaks of buff, margined on each side by a row of distinct black, deltoid spots; under tail-coverts somewhat similarly marked, but streaks more regular and spots much less distinct; under wing-coverts ochraceous, with obliquely transverse spots or interrupted bars of blackish. Bill light grayish horn-color, dusky at base; legs and feet grayish black. Length (skin, neck stretched), 13.30; wing, 5.80; tail, 5.70; culmen, 2.00; depth of bill at gonydeal angle, .40; tarsus, 1.25; middle toe, 1.05.

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* These measurements of total length are of course of little value, since they depend wholly on the "make" of the skins.

† "Bill, .05^{m} (or 25 lines long), very compressed, arched, black. Top of head dead black, with an oblong spot of buff ("rouille") in the middle of each feather. Neck above and back reddish-olive, with a rufous yellow line in the middle of each feather. Wings, rump, and tail cinnamon. Chin white; front and sides of neck, thorax, and flanks yellowish-olive, with a longitudinal streak of yellowish-white in the center of each feather. Middle of belly with three to four series of black spots. Under [tail?] coverts rufous, spotted with black and with a light stripe in the middle. Tarsi black. Total length, .33^{m} (12 inches)." (Translation.)

With almost exactly the pattern of coloration characterizing *X. promeropirhynchus*, this species has a closer general resemblance, on account of the prevalent olivaceous coloring, to *X. albicollis;* but the latter differs conspicuously in the decided black ground-color of the pileum, very much narrower streaks on breast, etc., bars on abdomen, darker chestnut of the tail, and several other characters. It does not require comparison with any other species except *X. ignotus, nobis*, which is much more rufescent, has the stripes on the breast, etc., much less regular, the throat whiter, etc.

Xiphocolaptes ignotus, sp. nov.

Sp. Char.—Similar to *X. virgatus*, but much more rufescent, streaks on pileum and hind-neck much narrower, those on breast, etc., much less regular, throat whiter, belly less distinctly spotted, and under tail-coverts barred with dusky.

Hab.—Ecuador.

Young male (type, No. 5263, Am. Mus. Nat. Hist., Ecuador; Verreaux collection, No. 38684).—Pileum, hind-neck, back, and scapulars mummy-brown, the first two narrowly streaked with light brownish or tawny buff, the upper back with a few narrow shaft-lines of the same; wings (including lesser and middle coverts), lower back, rump, upper tail-coverts, and tail, deep cinnamon-rufous or hazel, the outer webs of greater wing-coverts, primary coverts, and primaries more like the color of the back, and terminal portion of inner webs of six outer primaries dull dusky brown. Sides of head streaked with light buff and deep brown, the latter prevailing on upper portion of auricular region, the former predominating elsewhere; the two colors in about equal amount on malar region. Chin and upper throat plain dull white; rest of under parts light tawny-brown, the chest, breast, and sides broadly streaked with pale buff, each streak margined laterally with a blackish line; middle of lower breast with similar but more irregular streaks, with the blackish margin broken into spots, the belly similarly marked, but the paler streaks less defined and the general color more tawny; under tail-coverts broadly barred with blackish, the bars interrupted, however, by a narrow pale tawny streak along the shaft of each feather. Bill horn-color, becoming brownish white at tip; legs and feet dusky horn-color. Length (mounted specimen), about 10.00; wing, 5.75; tail, 4.80; culmen, 1.87; depth of bill at gonydeal angle, .40; tarsus, 1.25; middle toe, 1.12.

The specimen described is undoubtedly a young bird, though fully grown, except perhaps as to the bill. The adult would doubtless be somewhat different in plumage, but, judging from other species, could not be so much different as to render its identity with any other species with which it has been compared at all likely.

Xiphocolaptes compressirostris Taczan.

? *Xiphocolaptes promeropirhynchus* Scl., P. Z. S., 1859, 140 (Pallatanga, Ecuador).—Scl. & Salv., P. Z. S., 1873, 780 (Huasampilla, Peru).

Xiphocolaptes promeropirhynchus ? Taczan., P. Z. S., 1879, 231 (Tambillo, Peru).

Xiphocolaptes compressirostris Taczan., P. Z. S., Jan. 3, 1882, 28 (Rayurmana and Tambillo, N. E. Peru); Orn. du Pérou, II, 1884, 172.—Taczan. and von Berl., P. Z. S., 1885, 98 (San Rafael, Ecuador).

Hab.—Northern Peru and Southern Ecuador.

Sp. Char.—"Similar to *X. promeropirhynchus*, but bill shorter, more compressed, and pallid; fulvous streaks of the pileum and hind-neck narrower; back unicolored; throat fulvous, with two longitudinal stripes of brown; middle of belly broadly ochraceous, spotted with black; stripes of the breast margined with black lines; under tail-coverts brownish rusty, varied with black; wings and tail darker." (TACZAN., P. Z. S., 1882, 28; translation.)

Adult male.—" Entirely similar to *X. promeropirhynchus*, but differing in several details, particularly in the general coloration of the plumage being deeper; the rusty on the top of the head and neck much narrower, reduced to the shaft alone, and slightly enlarged on the barbels on the tip; the front part of the back would be almost unstriped did not the yellowish shafts of the feathers of this part produce some indication of stripes; throat uniform fulvous, crossed for whole length by two stripes formed by a series of brown spots; on the lower part of the throat, the breast, the upper abdomen, and the flanks rusty stripes, bordered on both sides by a well-defined black line; the middle of the abdomen mostly covered by feathers of an ochreous fulvous, of which each one is variegated by a series of black transverse stripes interrupted in the middle, so as to form a pronounced spotting; the under tail-coverts deeper and more rusty than the preceding [belly] and equally variegated with black; size somewhat larger [than *X. promeropirhynchus*], bill less long, more elevated and more compressed. Upper mandible of a horny-gray, with the tip black, lighter along the tomia, the lower one horn-blackish, passing gradually into plumbeous-gray towards the base; feet of an olive-plumbeous; iris deep brown.

"Total length, 342–350^{mm} [13.42–13.78 inches]; extent, 458–460^{mm} [18.00–18.11 inches]; wing, 152^{mm} [5.94 inches]; tail, 135^{mm} [5.31 inches]; bill, 52^{mm} [2.00 inches]; height of bill opposite nostrils, 12^{mm} [.47 inch]; length of tarsus, 32^{mm} [1.25 inches]; external toe without claw, 28^{mm} [1.10 inches]." (TACZAN., Orn. du Pérou, I, 1884, pp. 172, 173; translation.)

I refer with some doubt to this species a fine specimen from Guayaquil, Ecuador, in the National Museum collection (No. 101287, 1884, Dr. William H. Jones, U. S. Navy). It agrees with the above description so far as coloration is concerned, except that the back has narrow, pale, shaft-streaks, and the throat has four instead of two brown stripes. But the bill, instead of being shorter and more compressed than in *X. promeropirhynchus*, is longer and every way thicker, the culmen measuring 2.20, the depth at gonydeal angle .40, while it is also much more decurved.

Should this bird prove to be distinct from *X. compressirostris*, it might be appropriately named *X. saturatus;* and in view of the possibility of this proving to be the case, I append the following description:

Adult (No. 101287, Guayaquil, Ecuador, 1884; Dr. William H. Jones, U. S. Navy).—Pileum rather deep bistre (paler than in most examples of *X. promeropirhynchus*), each feather with a very fine mesial line or shaft-streak of buff; hind-neck and upper back similar, but rather lighter and brighter, with the streaks still narrower; scapulars, wing-coverts, and middle back Vandyke-brown; lower back, rump, upper tail-coverts, and remiges deep chestnut, the inner webs of longer primaries with terminal portion abruptly dusky (for the distance of 1.50 on third quill); tail very dark chestnut or chocolate. Supra-auricular region buff, streaked with deep brown; upper portion of auriculars deep brown narrowly streaked with brownish buff; a broad band of nearly plain buff on side of head, extending from lores beneath eyes over lower half, or more, of auriculars; beneath this a broad malar stripe of dark brown, streaked with buff; chin and throat dull buffy, the lower portion of the latter with several lines of dark brown; rest of lower parts deep raw-umber (inclining to burnt-umber laterally and posteriorly), the chest and breast very broadly streaked with buff, each buff streak margined on each side by a narrower streak of black; whole belly spotted with black, the median portion of each feather deep buff; under tail-coverts lighter burnt-umber, less distinctly spotted with dusky and streaked with buffy or light rusty. Bill deep horn-color, strongly decurved; feet dusky. Length (skin), 10.20; wing, 5.80; tail, 4.60; culmen, 2.20 (exposed part 1.90); bill from nostril, 1.55; depth of bill at angle of gonys, .40; tarsus, 1.28.

Speaking of a "female from San Rafael [Ecuador] collected on the 1st of March," Taczanowski (P. Z. S., 1885, pp. 98, 99) says:

> This bird is intermediate between those collected in Peru and the *X. promeropirhynchus* (Less.) from New Granada, but more nearly allied to the former in many respects. It has the two brownish stripes on the throat well pronounced. The middle of the abdomen is equally strongly spotted in its whole extent up to the breast, on the middle of which, even, there are also some black spots. The bill is intermediate, almost as high as in the Peruvian birds, but not quite so compressed. It seems to be even broader than in the six birds from New Granada (museums of Warsaw and von Berlepsch), with which it has been compared. The color of the bill is also intermediate, darker than that of the bill of the Peruvian bird, but not black as in *X. promeropirhynchus.*

Xiphocolaptes cinnamomeus, sp. nov.

SP. CHAR.—Smallest of the genus (wing 5.20, tail 4.30). Pileum cinnamon-brown (not very different from color of the back), narrowly streaked with cinnamon-buffy; lower parts light wood-brown, broadly streaked with pale dull buffy, the belly marked with small, rather indistinct transverse spots of dull grayish-brown, the breast with a few similar markings; chin, upper throat, lores, supra-auricular stripe, and broader stripe beneath eyes, buff.

HAB.—Eastern Brazil (Bahia?).

Adult (Type, No. 7868, Mus. Comp. Zool., "Bahia, Brazil; A. de Lacerda"*).—Pileum and hind-neck cinnamon-brown, each feather with a narrow and not very distinct mesial streak of pale cinnamon or cinnamon-buffy; back and scapulars cinnamon-brown, tinged with rusty, the former with narrow shaft-streaks of pale cinnamon-buffy; lower back, rump, and upper tail-coverts clear cinnamon-rufous; wings light cinnamon-rufous, outer webs of wing-coverts chiefly cinnamon-brown, and edges of remiges (except tertials and inner primaries) inclining to the same; tail deeper cinnamon-rufous, inclining to pale chestnut, the shafts of ten middle feathers blackish except towards tips. Lores, narrow supra-auricular stripe, and broader stripe from beneath eye across lower half of auriculars, plain dull buffy; a postocular stripe (occupying upper half of auriculars) and broad malar stripe dull cinnamon-brown, very indistinctly streaked with paler; chin and upper throat plain pale buffy; rest of under parts light wood-brown (or pale buffy cinnamon-brown), the lower throat, chest, breast, sides, and flanks, rather broadly streaked with pale buffy (streaks narrower on sides and flanks), some of the streaks, especially on breast, margined on each side with small spots of darker brown than the general color; belly with similar but more numerous spots, becoming nearly obsolete posteriorly; under tail-coverts light cinnamon, streaked with pale buffy; axillars and under wing-coverts light ochraceous marked with narrow transverse spots of dusky. Upper mandible dark horn-color, fading into pale horn-color terminally; lower mandible pale horn-color, paler and more yellowish on gonydeal angle, dusky horn-color basally; legs and feet horn-dusky. Length (skin), 10.90; wing, 5.20; tail, 4.30; culmen, 2.00; depth of bill at gonydeal angle, .40; tarsus, 1.18; middle toe, 1.00.

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*There is probably a mistake in the locality, the skin, a very perfect one, being of the unmistakable handsome, "make" of specimens from Ceará.

With the single exception of *X. major* (Vieill.), this is by far the most strongly characterized species that I have seen, and scarcely needs comparison with any other.

Xiphocolaptes major (VIEILL.).

Dendrocopus major VIEILL., Nouv. Dict., XXVI, 1818, 118 (Paraguay; *ex Trapadore Grande* AZARA); Enc. Méth., 1823, 624.

Dendrocolaptes major BONAP., Consp., I, 1850, 207.—LAFR., Rev. et Mag. Zool., 1850, 103.

Xiphocolaptes major VON BERL., J. f. O., Jan., 1887, 15 (Paraguay).—(?) SALVIN, Ibis, 1880, 359 (Tucuman, Arg. Rep.).—(?) WHITE, P. Z. S., 1882, 613 (Salta, Arg. Rep.).—(?) SCL. & HUDSON, Arg. Orn., I, 1888, 201 (part; Oran, Arg. Rep.; not the description!).

Dendrocolaptes rubiginosus LAFR., Mag. de Zool., 1833, Ois., pl. 16 (Buenos Ayres; type examined!).

SP. CHAR.—Above clear cinnamon-rufous, much paler on head and neck and darker on tail; ear-coverts light chestnut; chin and throat pale cinnamon streaked with buffy whitish; other under parts deeper cinnamon, streaked with pale buffy, the sides, flanks, and under tail-coverts rusty.

HAB.—Paraguay and Argentine Republic.

Adult male (No. 16327, Paraguay, June, 1859; Capt. T. J. Page, U. S. Navy).—Head and neck cinnamon-color, the chin and throat much paler and streaked with buffy; ear-coverts light chestnut; lores mixed dusky and dull buffy-whitish. Upper parts (except head and neck) clear cinnamon-rufous, deepening into chestnut on tail. Under surface of body light cinnamon, tinged with rusty, streaked with pale buffy, the middle of the belly barred with brownish; sides, flanks, under tail coverts, and under wing-coverts nearly uniform cinnamon-rufous or rusty. Bill horn-colored basally, horn-whitish on terminal half; legs and feet dusky.* Length (skin), 12.00; wing, 5.80; tail, 4.50; culmen, 2.32; tarsus, 1.30; middle toe, 1.07.

The type of *Dendrocolaptes rubiginosus* Lafr., now before me, agrees closely in coloration with the specimen described above, and undoubtedly belongs to the same species. It has the chin and throat a little paler, however, and the ear-coverts less distinctly chestnut, and the bill almost wholly horn-whitish. Length (mounted specimen), 11.50; wing, 6.00; tail, 4.80; culmen, 2.52; depth of bill at angle, .42; tarsus, 1.40; middle toe, 1.12.

Speaking of specimens from Lambaré, Paraguay, Count von Berlepsch remarks as follows (J. f. O., 1887, 15):

> The female collected on the 8th of January has blackish edges on the tips of the feathers of the crown, of which markings the other female shows no trace. The other has conspicuously red-brown cheeks [auriculars] and seems to be an older, more highly-colored bird. This bird also agrees essentially with a specimen in my collection from Tucuman.

It should be noted that in Vieillot's description of this species is an important error, in the statement that the under parts are streaked with black, whereas they are streaked with whitish. Since Vieillot expressly says that all the *other* species of the genus are streaked with white, it would seem that the mistake is not a mere "slip of the pen," thus rendering it probable that Azara himself, inadvertently perhaps, committed the error.

Xiphocolaptes major castaneus, subsp. nov.

Xiphocolaptes major SCL., Cat. Am. B., 1861, 164 (Bolivia; *nec Dendrocolaptes major* VIEILL.).—SCL. & SALV., Ex. Orn., pt. v, Jan., 1868, '71 (excl. syn.), pl. 36 (Bolivia).—SCL. & HUDSON, Arg. Orn., I, 1888, 201, part (description).

SP. CHAR.—Similar to *X. major* (Vieill.) of Paraguay and Argentina, but much deeper colored, especially on the head, neck, and under parts, the chin and throat dull russet-brown, instead of cinnamon-buffy, the light streaks of breast, etc., much narrower, bars on belly obsolete, and under tail-coverts deep chestnut.

HAB.—Bolivia.

Adult female (type, No. 33648, Am. Mus. Nat. Hist., Piedra Blanca, Bolivia, April 20, 1886; H. H. Smith).—Head russet-brown (scarcely paler on chin and throat), the ear-coverts chestnut, and the lores dusky; hind-neck chestnut-russet, deepening into bright rufous-chestnut on other upper parts, the upper tail-coverts being deep chestnut and the tail dark chestnut, with dusky shafts; feathers of pileum, hind-neck, upper back, chin, and throat with very narrow and indistinct paler shaft-streaks. Color of the under parts gradually brightening from brownish-russet on the throat through deep russet on the under surface of the body, where strongly tinged with rusty chestnut to deep chestnut on the under tail-coverts; chest, breast, upper belly, and anterior portion of sides with narrow mesial streaks or shaft-streaks of pale tawny, the middle of the belly showing a few, hardly discernible, faint bars of dull brownish; axillars and under wing-coverts rufous-tawny. Bill horn-color, paler at tip and on tomia and gonys; legs and feet horn-dusky. Length (skin), 12.80; wing, 5.70; tail, 4.70; culmen, 2.20; depth of bill at angle, .38; tarsus, 1.30; middle toe, 1.08.

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* "Iris light brown; beak pale slate, tip darker; legs and feet olive-green." (DURNFORD, Ibis, 1880, 359.)

There can be no doubt of the distinctness of the Bolivian bird from that of Paraguay and Buenos Ayres, at least as a well-marked geographical race. The description and colored plate in the Exotic Ornithology, "taken from a specimen in Sclater's collection, believed to be from Bolivia," agree very closely with the example described above.

The following species I have not seen:

(1) Xiphocolaptes simpliciceps LAFR.

Dendrocolaptes simpliciceps "Pucheran et Lafresnaye, in Mus. Parisiense," LAFR., Rev. et Mag. Zool., 1850, 100 (Yungas, Bolivia).

SP. CHAR.—"Above immaculate olive-brown, the head and neck unicolored; wing, rump, and tail cinnamon, the tail more intense; beneath same color as the back, but paler, the whole throat, superciliary stripe, another beneath the eyes, and extremely narrow oblong spots on the upper lateral portion of the head and on the breast, white, slightly tinged with ochraceous; middle of the belly and anal region paler, spotted with black, as if banded; the under wing-coverts yellowish ochraceous, distantly streaked with black; remiges brown or chestnut, black at tips.

"HABIT.—Yungas, collected by M. d'Orbigny." (Lafr., *l. c.;* translation.)

The most obvious character of *X. simpliciceps* consists in the entire absence of streaks on the pileum and hind-neck, in which respect it differs from every other known species of the genus excepting the otherwise very different *X. major* and *X. castaneus;* otherwise it seems to agree quite nearly with *X. compressirostris*,* in which the streaks on the head and neck above are narrower than in allied species.

(2) Xiphocolaptes lineatocephalus GRAY.

Dendrocolaptes lineatocephalus GRAY, Gen. B., I, 1847, pl. 43.
Dendrocops lineatocephalus BONAP., Consp., I, 1850, 207.
Xiphocolaptes lineatocephalus GRAY, Hand-l., I, 1869, 176, No. 2387.

No description is given of this bird, neither is any habitat assigned to it. In the "Hand-list," however, the habitat is given as Bolivia, while "*promeropirhynchus*, p., Sclat." is given as a synonym. It is doubtless one of several forms included by some authors under the comprehensive specific title of *promeropirhynchus*, but is probably different from the Colombian bird to which the name properly belongs. Since the type is doubtless in the British Museum, it should be easy to ascertain its true status.

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* Lafresnaye (*l. c.*) compares it with *X. promeropirhynchus*, *X. compressirostris* being then unknown.

(3) Xiphocolaptes procerus CAB. & HEINE.

Xiphocolaptes procerus CAB. & HEINE, Mus. Hein., II, Sept. 10, 1859, 36 (Caracas).—SCL., Cat. Am. B., 1861, 163 (Venezuela).—SCL. & SALV., Ex. Orn., I, 1869, 72; Nom. Neotr., 1873, 68.

? *Xiphocolaptes promeropirhynchus* SCL. & SALV., P. Z. S., 1868, 117 (Venezuela).

SP. CHAR.—"Similar to the following [*X. promeropirhynchus*] but larger, paler, bill longer and pale horn-color, throat yellowish-white, immaculate, and streaks and spots of under parts more indistinct.—Total length, 1″ 6‴; wing, 5″ 11‴; tars., 1″; tail, 5″.

"These specimens from Caracas seem to be intermediate, so to speak, between *X. emigrans* and *X. promeropirhynchus*. The head is lighter olive-brown, wing and tail lighter cinnamon-brown than in *X. promeropirhynchus*, while in *X. emigrans* the contour feathers are still more olive and the markings on the belly almost entirely obsolete. Whether *X. lineatocephalus* Gray belongs to this or to the following species [*X. promeropirhynchus*] it is not possible to determine with certainty from the figure alone without description and locality." (Cab. & Heine, *l. c.;* translation.)

This species is unknown to me except from the above description.

(4) Xiphocolaptes fortis HEINE.

Xiphocolaptes fortis HEINE, J. f. O., May, 1860, 185 (hab. ignot.).

SP. CHAR.—" The whole upper surface is exactly as in *X. procerus*, to which, on the whole, it is most nearly related; but the wings and tail are somewhat darker cinnamon red-brown, and the head is a little lighter colored and lighter striped; the under side may almost be said to be red-brown, and does not show the slightest tinge of the olive-colored admixture so very prominent in *X. emigrans*, less so in *X. procerus*, and also entirely wanting in *X. promeropirhynchus*. The color of the throat is brownish-yellow, between the yellow of *X. procerus* and the brownish of *X. promeropirhynchus*. The fore-neck is but very narrowly striped, almost more so than in *X. emigrans*. The blackish spot markings which in *X. procerus* and *X. promeropirhynchus* almost extend over the whole breast, in the present species hardly take up more space than in *X. emigrans*, and hardly more distinct than in the latter species, and are restricted to the very middle of the belly. Total length, 12 inches; wing, 5′ 8″, tail, 4′ 9″; culmen, 1′ 9″; tarsus, 1′ 1″; middle claw without claw, 1′ 1″; hind toe without claw, 5″.

"It is tolerably intermediate between the three nearly related species, *X. emigrans* Scl., from Guatemala, *X. promeropirhynchus* (Less.), from New Granada, and *X. procerus* Cab. & Heine, from Venezuela; and judging from this it might, perhaps, have come from Cartagena or Sta.

Marta. In size and coloration it reminds one particularly of the two latter. The stripes and spots of the under side are almost as obsolete as in the first mentioned, and the red-brown of the under side is almost as intense as in the Bogota bird, while the head is lighter than in all three." (Heine, *l. c.;* translation.)

This species would seem to be somewhat closely related to *X. emigrans costaricensis*, but to differ in the more rusty hue of the less distinctly streaked under parts and the lighter ground color of the pileum.

SMITHSONIAN INSTITUTION, *June* 29, 1889.

A REVIEW OF THE GENUS SCLERURUS OF SWAINSON.

BY

ROBERT RIDGWAY,

Curator of the Department of Birds.

The following attempt at a revision of the species of this difficult genus was brought about by the necessity of determining certain unnamed specimens in the National Museum collection. It has proved a difficult task, rendered particularly so by the confusion of synonyms which had to be unraveled, caused, in part, by the unnecessary "lumping together" of forms which, on comparison of specimens, are found to be perfectly distinct, although it is probable some of them will require a trinomial title when they shall have been found to intergrade with others. For the exact purposes of modern ornithological science it is necessary to recognize such forms by name, their habitat being as well defined as that of perfectly distinct species, and their distinctive characters often, within a given area, as marked.

I have fortunately been able to examine a number of specimens kindly lent for the purpose by the authorities of the American Museum of Natural History, in New York City, to whom my thanks are due, as well as to Dr. P. L. Sclater, of London (now engaged in the preparation of the catalogue of the birds of this family in the British Museum), for the loan of an example of *S. albogularis* (Swains.), from Venezuela.

Genus **Sclerurus** SWAINSON.

Sclerurus SWAINS., Zool. Jour., 1827, 356 (type, *S. albogularis* SWAINS).
  Scelurus BURM., Th. Bras., III, 1856, 45.
Tinactor MAX., Beitr., III, 1831, 1106 (type, *T. fuscus* MAX.).
Oxypyga MÉNÉTR., Mém. de l'Acad. St. Petersb., VI ser., Sci. Nat., I, 1835, 519 (type, *O. scansor* MÉNÉTR.,=*Myiothera umbretta* LICHT.).

GENERIC CHAR.—Similar to *Furnarius*, Vieill., but tail-feathers with very stiff, acuminate-pointed shafts, wing more rounded, tarsi shorter and much more compressed. Bill slender, nearly straight to near tip, where rather abruptly decurved; nostrils exposed, oval, with small overhanging membrane; third, fourth, and fifth quills longest, the first shortest; tail decidedly shorter than wing, much rounded or graduated; tarsus about equal to exposed culmen (sometimes a little longer, sometimes a little shorter), much compressed, distinctly scutellate; middle toe (without claw) decidedly shorter than tarsus; lateral claws very unequal in length (outer much the longer); hind toe very stout (about equal to the outer in length), with claw very large. Color: Plain brownish, the rump and upper tail-coverts usually more rusty, sometimes bright chestnut; under parts paler than upper, the throat sometimes whitish; no superciliary stripe, and inner webs of primaries unicolored.

RANGE.—Southern Mexico to Argentine Republic.

KEY TO THE SPECIES.

a^1. Lower rump and upper tail-coverts chestnut, distinctly different from color of back.
  b^1. Chin and throat whitish or grayish, distinctly different from color of chest.
    c^1. Chin and throat uniform dull white or grayish white, the feathers margined or tipped with dark grayish or dusky. *Hab.*, Brazil, south of the Amazon Valley........................*S. umbretta* (LICHT.) (p. 22).
    c^2. Chin and upper throat white, lower throat gray, the feathers without distinct (if any) darker tips or margins.
      d^1. Chest olive-tawny or raw-umber, the belly, etc., grayish olive; upper parts olive, the lower rump and upper tail-coverts bright chestnut. *Hab.*, Venezuela and Tobago.............*S. albogularis* (SWAINS.) (p. 24).
      d^2. Chest chestnut-brown or burnt-umber, the belly, etc., dull slate-color tinged with dark rusty; upper parts dark umber-brown, the lower rump and upper tail-coverts dark chestnut. *Hab.*, Costa Rica.
S. canigularis RIDGW. (p. 24).
  b^2. Chin and throat bright russet or rufous-tawny, like color of chest. *Hab.*, Southern Mexico to Peru and Lower Amazons....*S. mexicanus* SCL. (p. 25).
a^2. Lower rump and upper tail-coverts similar in color to back, or only slightly more rufescent.
  b^1. Chin and throat tawny or russet, like chest. *Hab.*, Guiana.
S. caudacutus (VIEILL.) (p. 27).
  b^2. Chin and upper throat with basal portion of feathers whitish or very pale brownish, their tips or terminal margins dark brown or dusky.
    c^1. General color umber or sepia brown.
      d^1. Throat brown, with basal portion of feathers dull brownish-white or pale brownish. *Hab.*, Upper Amazons...........*S. fuscus* (MAX.) (p. 28).
      d^2. Chin and upper throat white, the feathers tipped or margined with brown or dusky.
        e^1. Chest without spots or distinct streaks of tawny, and general coloration lighter brown.
          f^1. General color deep chocolate-brown; smaller (wing, 3.30–3.46; tail, 2.10–2.30). *Hab.*, Colombia.....................*S. brunneus* SCL. (p. 29).
          f^2. General color vandyke-brown, more olivaceous on under parts, the sides of head and neck and upper chest brownish-tawny; larger (wing, 3.95; tail, 3.10). *Hab.*, Eastern Brazil (Bahia).
S. lawrencei RIDGW. (p. 29).
        e^2. Chest with distinct spots or streaks of tawny, and general color much darker brown. *Hab.*, Southern Mexico to Panama.
S. guatemalensis HARTL. (p. 30.)
    c^2. General color olivaceous. *Hab.*, Western Peru......*S. olivascens* CAB. (p. 31).

Sclerurus umbretta (LICHT.).

Myiothera umbretta LICHT., Verz. Doubl., 1823, 43, No. 471 (Bahia).
Myioturdus umbretta MÉNÉTR., Mém. de l'Acad. St. Petersb., VI ser., Sci. Nat., I, 1835, 468 (Bahia).
Formicarius umbrettus GRAY, Gen. B., I, 1840, 211.
Sclerurus umbretta SCL. & SALV., Nom. Neotr., 1873, 62.—SCL. & HUDS., Arg. Orn., I, 1888, 174 (Misiones, Arg. Rep.).

Myöthera caudacuta LAFR., Mag. de Zool., 1833, pl. 10 (Brazil; *nec Thamophilus caudacutus* VIEILL.)

Sclerurus caudacutus BURM., Verz. Mus. Hal. ——, 45; Th. Bras., III, 1856, 45 (New Freiburg; "*Scelurus*").—CAB., Mus. Hein., II, 1859, 25 (Brazil; excl. syn. *albogularis* Sw.).—SCL., Cat. Am. B., 1861, 149 (Brazil; excl. syn. pt.).—PELZ., Orn. Bras., II Arb., 1869, 86 (Registro do Sai, Rio August, Ypanema, and Borba).—WHITE, P. Z. S., 1882, 610 (Misiones, Arg. Rep.).—TACZAN., Orn. du Pérou, II, 1884, 114 (Peru, *ex* TSCHUDI).

Oxypyga scansor MÉNÉTR., Mém. Ac. St. Petersb., VI ser., Sci. Nat., I, 1835, 520, pl. 11, (Rio de Janeiro and Minas Geraes).

Tinactor fuscus MAX., Beitr., III, 1831, 1106 (part; female only!).

SP. CHAR.—Above clear brown, becoming bright chestnut on rump and upper tail-coverts; beneath paler, more olive, brown, becoming bright russet on chest (where usually paler shaft-streaks), the throat whitish, with dull brownish margins to feathers; tail dusky.

HAB.—Brazil, south of the Amazon; west to eastern Peru.

Adult male (No. 32796, Brazil; Ed. Verreaux).—Above clear mummy-brown, duller (more bistre) on pileum, the rump and upper tail-coverts bright chestnut; wing-coverts margined with rusty brown; tail chocolate-brown basally, deepening towards tip into brownish black. Sides of head similar to pileum, but slightly paler; chin and upper throat dull brownish-white, the feathers indistinctly margined with brownish; lower throat light tawny-brown, the feathers with paler shaft-streaks; chest bright russet, with similar lighter shaft-streaks; other under parts olive-brown or raw-umber, tinged with brighter brown on sides and flanks and changing to more ruddy brown, or light burnt-umber, on lower tail-coverts. Bill dusky brown, the basal half of under mandible paler; feet dusky brown. Length (skin), 7.70; wing, 3.85; tail, 3.30; exposed culmen, .90; tarsus, .90; middle toe, .75.

Adult female (No. 32795, Brazil; Verreaux).—Similar to the male described above, but smaller. Length (skin), 6.70; wing, 3.50; tail, 2.80; exposed culmen, .90; tarsus, .90; middle toe, .72.

There are before me nine examples of this species, six of which have no more definite locality attached to them than "Brazil," while one of them has no indication whatever of locality. The other two are, respectively, from Rio Grande do Sul (No. 88453, U. S. Nat. Mus., H. von Jaering, collector), and Chapada, Matto Grosso (No. 33762, Am. Mus. Nat. Hist., H. H. Smith, collector).

Tinactor fuscus Max., which is quite universally cited as a synonym of *Myiothera umbretta* Licht., is so in part only. The two types, belonging to the American Museum of Natural History, are now before me, and are evidently the identical specimens from which the descriptions in the "Beiträge" were taken. The specimen described as the female is true *S. umbretta*, but that described as the male is identical with the Rio Napo bird, identified by Messrs. Sclater and Salvin with *S. brunneus* Scl., and if not really the latter must stand as a distinct form, *S. fuscus* Max. (See remarks under *S. fuscus*, on page 28.)

S. umbretta is a strongly characterized species, easily distinguished from its nearest allies by the combination of bright chestnut rump and upper tail-coverts, with bright russet or tawny-rufous chest and olive-brown under parts, and is apparently entirely confined to Brazil south of the Amazon.

Sclerurus albogularis SWAINS.

Sclerurus albogularis SWAINS., B. Bras., 1834-'41, pl. 87; Zool. Jour., 1827.—JARD., Ann. and Mag. N. H., XIX, 1847, 80 (Tobago).—SCL. & SALV., P. Z. S., 1868, 627, 630 (Venezuela).

SP. CHAR.—Somewhat like *S. umbretta*, but lower throat plain light gray, upper throat and chin dull white, without distinct squamations, chest olive-tawny, and other under parts dull grayish olive.

HAB.—Venezuela and Tobago.

Adult (coll. P. L. Sclater, Venezuela, 1868; Goering).—Pileum and hind-neck, brownish olive; back similar, but slightly browner, becoming clear bistre posteriorly and changing to bright chestnut on rump and upper tail-coverts; tail dull brownish black, browner basally, especially on edges of the feathers. Chin and upper throat dull white, some of the feathers with very faint darker margins; lower throat plain dull light gray, the cheeks similar, but tinged with olive-brown; chest tawny-olive, approaching raw-umber; rest of under parts grayish olive, the under tail-coverts rusty brown (intermediate between vandyke-brown and burnt-umber). Upper mandible black, the tip and edges brownish; lower mandible with basal half whitish, terminal half brownish; legs and feet dusky brown. Length (skin), 6.50; wing, 3.40; tail, 2.50; exposed culmen, .80; tarsus, .85; middle toe, .77.

A specimen in the U. S. National Museum collection from Tobago (No. 74884, April, F. A. Ober) agrees exactly in coloration with the Venezuela specimen described above. It measures as follows: Length before skinning, 7.25; skin, 6.30; wing, 3.50; tail, 2.50; exposed culmen, .82; tarsus, .80; middle toe, .70.

Sclerurus canigularis, RIDGW.

Sclerurus canigularis RIDGW., Proc. U. S. Nat. Mus., xi, 1889, 542.

SP. CHAR.—Somewhat like *S. umbretta* (Licht.), but much smaller and darker in color, the chest dark chestnut and the throat, abruptly, deep dull ash gray, fading into grayish white anteriorly.

HAB.—Costa Rica.

Adult male (type, No. 115038, U. S. Nat. Mus., Turrialba, Costa Rica, August, 1886; J. J. Cooper).—Prevailing color of upper parts plain dark sooty brown, overlaid on hind-neck, back, scapulars, wing-coverts, and tertials, with a wash of burnt-umber, this changing to dark chestnut on rump and upper tail-coverts; tail brownish black. Sides of head dull grayish brown, this changing gradually to dull grayish white on chin and upper throat and to dull ash gray on lower throat; chest deep chestnut brown (abruptly defined against gray of throat), this changing gradually into dull dark sooty brown on rest of under parts; lower tail-coverts tinged with dark chestnut. Upper mandible black, lower chiefly light colored; legs and feet brownish black. Length (skin), 6.00; wing, 3.45; tail, 2.55; exposed culmen, .85; tarsus, .85.

Since the above was written I have received a specimen of *S. albogularis* Scl. from Dr. P. L. Sclater, who writes me that my *S. canigularis*, the type of which was submitted to him for examination, is the same species. I can not, however, see why he should hold this view, since, placing side by side the type of *S. canigularis*, Dr. Sclater's *S. albigularis* (from Venezuela), and any one of several specimens of *S. umbretta* (Light.) (from Brazil), it is at a glance obvious that *S. canigularis* is much more different from *S. albigularis* than the latter is from *S. umbretta*, though the two latter are distinct enough.

S. canigularis is altogether a darker-colored bird than *S. albogularis*, of which the U. S. National Museum possesses an example from Tobago (No. 74884, F. A. Ober, collector), agreeing very closely with Dr. Sclater's Venezuelan specimen.

The differential characters of the three species may be expressed as follows:

*a*¹. Feathers of throat tipped or broadly margined with olive-brownish.
  Under parts light bistre-brown, tinged with olive, becoming russet-brown on chest. *Hab.* Brazil ....*S. umbretta.*
*a*². Feathers of throat without brownish tips or margins.
  *b*¹. Under parts dull grayish olive, becoming tawny-olive on chest; back and scapulars bistre-brown tinged with olive; lower half of throat dull light gray; upper half, including chin, dull white. *Hab.* Venezuela and Tobago. *S. albogularis.*
  *b*². Under parts dark slaty, tinged, on tips of some feathers, with bright mummy-brown, the chest deep burnt-umber brown; lower half of throat deep grayish; upper half, including chin, paler, but scarcely approaching white; back and scapulars deep vandyke-brown. *Hab.* Costa Rica..........*S. canigularis.*

Sclerurus mexicanus SCL.

? *Sclerurus ruficollis* SWAINS., "Birds Braz.," II ["1834–1841"], Tb. 79.

Sclerurus mexicanus SCL., P. Z. S., August 8, 1856, 290 (Cordova, Vera Cruz, Mexico); 1859, 365 (Jalapa); 1864, 175 (city of Mexico); Cat. Am. B., 1861, 149 (Cordova, Mexico; Coban, Guat.).—SCL. & SALV., Ibis, 1860, 35 (Coban); P. Z. S., 1867, 574 (Capim R., Lower Amazon), 750 (Yurimaguas and Chyavetas, E. Peru); Nom. Neotr., 1873, 62 (Mexico to Amazonia).—LAWR., Ann. Lyc. N. Y., VII, 1862, 465 (Panama).—SALVIN, P. Z. S., 1867, 14 (Veragua).—SUMICHR., Mem. Bost. Soc., I, 1869, 555 (Vera Cruz).—TACZAN., Orn. du Pérou, II, 1884, 115 (Yurimaguas).

Sclerurus gautemalensis (sic) LAWR., Ann. Lyc. N. Y., VII, May, 1863, 4 (Isth. Panama).*

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* This reference of Mr. Lawrence's *S. guatemalensis* is made on the strength of his having previously mentioned the specimen to which it refers (under name of *S. mexicanus*) as having a rufous throat, which at once distinguishes *S. mexicanus* from *S. guatemalensis*. What is probably the very same specimen is now before me and is labeled in Mr. Lawrence's handwriting "*Sclerurus gautimalensis.*" Its locality is Lion Hill, near Aspinwall (No. 41585, U. S. Nat. Mus.).

? *Sclerurus rufigularis* PELZ., Orn. Bras., II Arb., 1869, 161 (Maribatanas; *ex* "*Tinactor rufigularis* Natterer Catal. msc.").[*]

SP. CHAR.—Above plain deep brown, duller (bistre) on head, changing to bright chestnut on rump and upper tail-coverts; tail dusky; throat and chest tawny or tawny-chestnut, the chin sometimes paler; rest of under parts similar to back, etc., but rather paler. Length (skin), about 6.00.

HAB.—Southern Mexico to Eastern Peru and Lower Amazons; Bahia?

Adult male (No. 42144, Protrero, Vera Cruz, February 20, 1866; F. Sumichrast).—Above bistre-brown, duller anteriorly, brighter on lower back, and changing to chestnut on rump and upper tail-coverts; tail dusky or dull blackish brown terminally, more brown basally, the feathers edged, except near tips, with the color of the lower back; edges of greater wing-covert and secondaries more rusty brown than back. Throat light russet or rusty cinnamon (chin paler), deepening on chest and upper breast into chestnut-russet; rest of under parts plain brown (intermediate between mummy-brown and bistre), the under tail coverts more rusty. Upper mandible blackish brown, lower pale brownish or brownish white, becoming dusky terminally; tarsi clear brownish, toes darker. Length (skin), 6.00; wing, 3.15; tail, 2.40; exposed culmen, .95; tarsus, .85; middle toe, .70.

Adult female (No. 42120, Mirador, Vera Cruz; C. Sartorius).—Similar to the male described above, but colors brighter, the entire throat, chest, and breast bright chestnut-tawny, lower parts more tinged with the same, and chestnut of rump and upper tail-coverts brighter. Length (skin), 5.90; wing, 3.20; tail, 2.40; exposed culmen, .95; tarsus, .80; middle toe, .70.

Immature male (coll. Am. Mus. Nat. Hist.,[†] Panama, 1862; J. McLeannan).—Similar to adults, but colors rather duller, especially on the throat and chest, where the color is paler or more tawny, some of the feathers with very indistinct dull brownish tips or margins and paler shaft-streaks.

An adult (sex not determined) from Guatemala (No. 30771, Coban, Vera Paz, March, 1860; O. Salvin), is much deeper colored than either of the Mexican skins described above, the upper parts being a very deep vandyke-brown, and the throat a bright chestnut. Length (skin), 5.90; wing, 3.20; tail, 2.35; exposed culmen, .88; tarsus, .80; middle toe, .72.

An adult male from the Isthmus of Panama (No. 41585, Lion Hill, near Aspinwall, J. McLeannan) is almost identical with the preceding in coloration, but is somewhat smaller, measuring as follows: Length

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[*] Brunneus, dorso inferiore rufescente, gula et collo superiore ochraceis, pectore ferrugineo lavato, cauda nigrescente. Longit. (specim. exsicc.) 6'', alæ 3'' 1''', caudæ 2'' 3''', rostri a rictu 11''', tars. 9½'''. (PELZ., *l. c.*)

[†] Lawrence collection.

(skin), 5.60; wing, 3.10; tail, 2.35; exposed culmen (bill broken); tarsus, .85; middle toe, .72.

A specimen said to be from Bahia, in the collection of the American Museum of Natural History (Lawrence collection), agrees exactly in all essential features with the Panama and Guatemala specimens mentioned above. It measures as follows: Length (skin), 6.35; wing, 3.40; tail, 2.70; exposed culmen, .85; tarsus, .88; middle toe, .75.

I have been unable to refer to the "Birds of Brazil" in order to ascertain whether the *Sclerurus ruficollis* of Swainson is the same as this species; but a specimen in the Lafrasnaye collection (No. 2323 *ter.*), kindly lent to me by the authorities of the Boston Society of Natural History, labeled "*Sclerurus ruficollis* Swains., Brazil," is so much like examples of *S. mexicanus* that I can not distinguish it satisfactorily. The only differences that I am able to find consist in the shorter bill (the exposed culmen measuring only .82 against .90–1.00 in Central American specimens), and rather lighter color of the pileum and hind-neck; but these differences are so slight that I am not inclined to regard them as of any importance or as representing more than a moderate extent of individual variation.

Sclerurus caudacutus (VIEILL.).

Thamnophilus caudacutus VIEILL., Nouv. Dict., III, 1816, 310 (Guiana); Enc. Méth., 1823, 742.

? *Myiothera caudacuta* LAFR., Mag. de Zool., 1833, pl. 10.—GRAY, Gen. B., I, 1846, 210.

Sclerurus caudacutus BONAP., Consp., I, 1850, 210.—SCL. & SALV., P. Z. S., 1867, 573 (Capim R., Lower Amazon); Nom. Neotr., 1873, 62 (part).—SALVIN, Ibis, 1885, 419 (Br. Guiana).

? *Sclerurus caudacutus*, var., PELZ., Orn. Bras., II Arb., 1869, 66* (Maribatanas).

SP. CHAR.—Plain vandyke-brown, rather lighter beneath, where becoming russet on chest and tawny or ochraceous on throat; rump and upper tail-coverts more ruddy brown or burnt-umber; tail dusky brown.

HAB.—Guiana and Lower Amazons.

Adult (specimen in Lawrence collection, Am. Mus. Nat. Hist., from Cayenne).—Above uniform clear vandyke-brown, becoming chestnut-brown or burnt-umber on rump and upper tail-coverts; tail dusky brown, lighter basally; sides of head and neck, chest, and lower throat russet-brown, the under surface of the body, including under tail-coverts, similar in color to back, but paler, more of a mummy-brown hue. (Upper throat and chin apparently tawny or ochraceous, but the feathers of these parts wanting.) Bill brownish black, the basal half of the lower mandible brownish whitish; legs and feet brown. Length (skin),

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* "A female and a male (from Maribatanas, April, 1831) are very similar to *Sclerurus caudacutus*, though somewhat smaller (but not so small, however, as those of No. 999 [*S. rufigularis*]); the tail is shorter, lower back brown like upper back, only the upper tail-coverts somewhat reddish-brown (*S. caudacutus* has the lower back and upper tail-coverts dark rust-colored), and the upper breast hardly a trace of ochre." (PELZ., *l. c.*; translation.)

6.70; wing, 3.75; tail, 2.90; tarsus, .87; middle toe, .75. (Bill with tip broken.)

Sclerurus fuscus (Max.).

Tinactor fuscus Max., Beitr., III, 1831, 1106 (part; male, but not female).
? *Sclerurus caudacutus* Scl. & Salv., P. Z. S., 1867, 750 (Yurimaguas and Chyavetas, E. Peru.)

Sp. Char.—Uniform vandyke or mummy brown, slightly paler and more tawny on sides of head and neck and under portions of the same, and slightly more rufescent on rump and upper tail-coverts; feathers of chin and upper throat indistinctly paler basally.

Hab.—Upper Amazons.

Adult male (No. 6807, American Mus. Nat. Hist.; type of *Tinactor fuscus* Max.!)—Uniform bright vandyke-brown, inclining to mummy-brown on under parts, the rump and upper tail-coverts inclining to burnt-umber, and the forehead, sides of head and neck (especially on malar region) lighter and more tawny, this color extending indistinctly around hind-neck; chin and upper throat dull brownish white, but this nearly hidden by broad brown tips to the feathers; lower throat and chest mummy-brown, like under parts of the body, but slightly tinged or mixed with tawny. Tail dark dull brown, less dusky toward base, especially on edge of feathers. Upper mandible with basal half blackish, terminal half and entire edge brownish; lower mandible whitish, brownish terminally. Length (mounted specimen), 6.50; wing, 3.55; tail, 2.90; exposed culmen, .80.

Young male (No. 32797, Rio Napo; maison Verreaux).—Uniform vandyke-brown, becoming burnt-umber on lower rump and upper tail coverts, lighter vandyke-brown, or almost mummy-brown, on chest, the throat and sides of head still slightly paler, the feathers of chin and upper throat pale brownish or dull brownish white basally; tail blackish brown terminally, more brown basally and on edge of feathers. Upper mandible brownish black, browner terminally and on edges; lower mandible dusky brown, paler at base; legs and feet dusky brown. Length (skin), 7.40; wing, 3.50; tail, 2.75; exposed culmen, .80; tarsus, .87; middle toe, .75.

The type of *Tinactor fuscus* Max., described above, is certainly specifically identical with the immature Rio Napo skin labeled by Verreaux "*Sclerurus brunneus* Scl., juv. ♂." In fact, the two are absolutely alike in coloration, though the difference in the texture of the plumage shows at once that one is an adult and the other a young bird.

While there is considerable resemblance to *S. brunneus* Scl., the size is considerably greater, and there is no admixture of white on the throat, the latter showing distinctly even in a young bird of *S. brunneus*, from the Rio Ingador, Colombia. (See remarks on the latter, p. 29.)

The specimen described by Maximilian as the female of *T. fuscus* (Beitr., III, p. 1109) is a typical specimen of *S. umbretta*, and was probably from a different locality. Unfortunately Prince Maximilian does not specify the localities where his specimens were obtained, merely remarking that he obtained *T. fuscus* (including, of course, both species under this name) first in the forests of the river Itabapuana, between the parallels of 21° and 22° south latitude, apparently a tributary of the Paraguay, and afterwards in the forests of the river Belmonte, in Eastern Brazil (province of Minas Geraes). If he met with these birds at only these two localities and obtained only the two specimens which formed part of his collection, it seems very probable that the type of *T. fuscus* came from the former locality, thus considerably extending the range of the species.

Sclerurus brunneus SCL.

Sclerurus brunneus SCL., P. Z. S., 1857, 17 (Bogota); (?) 1858, 62 (Rio Napo); Cat. Am. B., 1862, 149 (part).—SALVIN, Ibis, 1885, 419.

SP. CHAR.—Uniform reddish-brown or chocolate, the chin and upper throat white with brown or dusky margins to the feathers.*

HAB.—Colombia.

Young (No. 17505, Mus. Comp. Zool., Rio Ingador, near Pacific coast, Colombia; A. Schott).—Prevailing color deep chocolate-brown, the under parts paler and duller (intermediate between light vandyke-brown and bistre); tail brownish-black; feathers of chin and upper throat white, broadly margined with blackish-brown; chest tinged with burnt-umber, the feathers with indistinct shaft-streaks of pale tawny. Wing, 3.30; tail, 2.30; exposed culmen, .77; tarsus, .83; middle toe, .72.

I have not seen an adult specimen of this species, which Mr. Salvin regards as valid (*cf.* Ibis, 1885, p. 419), which opinion is certainly decidedly indicated by the single immature example now before me. According to Dr. Sclater (P. Z. S., 1857, p. 18), it differs from its nearest allies as follows: "From *S. caudacutus* of Brazil [*i. e.*, *S. umbretta* (Licht.)] and *S. mexicanus* * * * of Mexico and Guatemala it differs in the want of the bright rufous coloring in the rump and foreneck. In this respect it would seem to resemble Hartlaub's *S. guatemalensis* * * * but that bird is said to be of the size of *S. caudacutus*, to which the present species is inferior in dimensions."

Sclerurus lawrencei, sp. nov.

SP. CHAR.—Similar to *S. guatemalensis* (Hartl.), but much larger (wing, nearly 4.00; tail, 3.00 or more); the coloration of lower parts in the adult exactly as in the young of that species.

HAB.—"Bahia" (but locality probably erroneous).

Adult female (Coll. Am. Mus. Nat. Hist., "Bahia"; Lawrence collection).—Above, warm bistre-brown, changing to burnt-umber on rump and upper tail-coverts; tail brownish-black, browner at base; sides of head and neck light cinnamon-brown, indistinctly clouded or broken by dark, duller brown; chin and throat white, the feathers indistinctly margined with dull brown; chest dull tawny-brown (much like color of malar region and sides of neck), gradually changing into light bistre, tinged with raw-umber on other under parts. Bill dusky, with lower mandible chiefly pale brownish; legs and feet dusky brown. Length (skin), 7.30; wing, 3.95; tail, 3.10; exposed culmen, .80; tarsus, .93; middle toe, .78.

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* The characters ascribed in the original description, freely translated, are as follows: "Above, brown tinged with cinnamon; beneath, slightly paler; throat mixed with white; wings and tail-feathers with inner webs blackish, external margins similar in color to the back; bill black, the base yellowish; feet black. Total length, 6.00; wing, 3.40; tail, 2.10."

This species, of which I have seen only the specimen described above, differs from *S. umbretta* in the brown instead of bright-chestnut color of the rump and upper tail-coverts, absence of reddish-brown on chest, and more distinctly white throat. It is also larger, though some specimens referred to *S. umbretta* approach it very closely in size.

Sclerurus guatemalensis (HARTL.)

Tinactor guatemalensis HARTL., Rev. Zool., 1844, 370.

Sclerurus guatemalensis SCL. & SALV., P. Z. S., 1864, 354 (Panama); Nom. Neotr., 1873, 62 (Guatemala).

Scleurus [*sic*] *caudacutus* (VIEILL.) LAWR., Ann. Lyc. N. Y., VII, 1861, 320 (Panama; *nec Thamnophilus caudacutus* VIEILL.).

SP. CHAR.—Similar to *S. umbretta* (Light.), but darker, with rump and upper tail-coverts deep vandyke or bistre brown instead of bright chestnut, feathers of throat much more distinctly margined with dusky, and chest much less russet, as well as (usually) streaked or flecked with light tawny.

HAB.—Guatemala to Isthmus of Panama.

Adult male (No. 116589, Jiménez, Costa Rica, April, 1886; Anastasio Alfaro).—Above uniform very deep vandyke-brown, somewhat brighter on wings and upper tail-coverts; tail brownish black. Chin and throat white, the feathers broadly margined with dusky; rest of under parts bistre or sepia, brighter on chest, where feathers have a central space (including shaft-streak) of light tawny. Bill blackish, basal half of lower mandible whitish; feet blackish brown. Length (skin), 6.60; wing, 3.50; tail, 2.60; exposed culmen, .85; tarsus, .90; middle toe, .75.

Adult female (No. 64822, Sibuhue, Talamanca, Costa Rica, May, 1873; J. C. Zeledon).—Similar in plumage to the male, as described above. Length (skin), 6.20; wing, 3.50; tail, 2.60; exposed culmen (bill broken); tarsus, .87; middle toe, .75.

Young female (Coll. Am. Mus. Nat. Hist., Panama, 1862; J. McLeannan).*—Similar to the adult, but under parts much more uniform, the white of throat duller and with much less distinct squamations, the chest uniform mummy-brown, with only a few fine shaft-streaks of paler.

In addition to the three specimens described above, there are now before me a young female in transition plumage from Panama (No. 53806, McLeannan) and an adult male and two young birds (one a male) from

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* Lawrence collection.

Costa Rica, belonging to the Costa Rica National Museum. These show a considerable amount of individual variation, the two young birds from Costa Rica being particularly unlike, one resembling the Panama specimen described, though considerably darker above and less tinged with tawny beneath, while the other (No. 2334, male, San Carlos, December 25, 1888, A. Alfaro) is very much darker throughout, the under parts being mainly of a dark sepia-brown.

Sclerurus olivascens CABANIS.

Sclerurus olivascens CAB., Jour. für Orn., Jan., 1873, 67 (Monterico, W. Peru).—TACZAN., P. Z. S., 1874, 526 (Monterico); Orn. du Pérou, II, 1884, 115.

HAB.—Western Peru.

SP. CHAR.*—"Nearly uniform olive-brown; the breast more olive; throat whitish, undulated with olive; tail black." (Taczan., Orn. du Pérou, II, 1884, 115; translation.)

"*Female adult.*—General plumage of a dusky fuliginous-olive, the olive clearer on the under parts, especially on the breast; middle of the throat whitish, undulated with olive. Wings of the same color as the back; tail blackish. Bill brown, the lower mandible paler, whitish underneath; feet brown; iris deep brown.

"Length of the wing, 95; tail, 70; bill, 24; tarsus, 23 millimeters."

"OBSERVATIONS.—A form similar to the preceding [*S. umbretta*], the bill shorter and straighter, the general color more uniform, the rump concolor with the back." (Taczanowski, *l. c.;* translation.)

SMITHSONIAN INSTITUTION, *June* 29, 1889.

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* The original description, by Cabanis (*l. c.*), translated, is as follows: "In general resembling the Brazilian *Sc. umbretta*, with somewhat longer wings (94^{mm}). It differs in coloring by the want of the brownish red rump, which is uniformly colored with the other upper parts. The rusty reddish tinge to the whole plumage is replaced by a brownish olive color. Throat mixed with whitish. Hab. Monterico. Female. The male is still unknown. The female is characterized in all the species by the whitish throat. In the Brazilian *S. umbretta* the male has a rusty red throat. *Sc. ruficollis* Sws., which Gray considers identical with *S. mexicanus*, is the male of *S. umbretta*. On the other hand, the very similarly colored *mexicanus* is to be considered as the male of a somewhat smaller variety."

It may be remarked regarding the alleged sexual differences in color that, so far as I am aware, no other author appears to hold views similar to those expressed by Professor Cabanis. The circumstance that *S. mexicanus* inhabits the combined areas of several other species is of itself sufficient to disprove them, while even more convincing is the fact that in the series of specimens of the two Middle American species (*S. mexicanus* and *S. guatemalensis*), both sexes, according to the determinations of the collectors, are represented in each.

DESCRIPTIVE NOTES OF NEW GENERA AND SPECIES FROM THE LOWER CAMBRIAN OR OLENELLUS ZONE OF NORTH AMERICA.*

BY

CHARLES D. WALCOTT,

Honorary Curator of the Department of Invertebrate Fossils.

The types of the new genera and species described in this paper are in the collection of the National Museum, and may be identified by the Museum catalogue number given with the description of each species. The illustrations of the species will be published in the Tenth Annual Report of the Director of the U. S. Geological Survey for the year ending June 30, 1889.

CORALS.

It has been an open question for many years whether the forms referred to the genus *Archæocyathus*, Billings, were corals or sponges (see Bull. U. S. Geol. Survey, No. 30, 1886, p. 78–80). Dr. G. J. Hinde has recently reviewed the genera and species,† and concluded that "the *Archæocyathinæ* form a special family of the *Zoantharia sclerodermata*, in some features allied to the group of perforate corals." Although previously inclined to consider the forms under notice sponges, I am now of the opinion that Dr. Hinde is more nearly correct in referring them to the corals.

Protopharetra BORNEMANN.

See Geol. Zeitschr., 1883, p. 274.

Protopharetra sp. ?

This is a form related to *P. polymorpha* Bornemann.‡ It varies in *form of growth* from round stems to flattened fronds, in which the structure is very irregular. It is an open question if *Spirocyathus atlanticus* is not generically identical with *Protopharetra*.

LOCALITY.—Silver Peak, Nevada.

Nat. Mus. Cat. Invt. Foss., No. 15303.

Spirocyathus HINDE.

See Quart. Jour. Geol. Soc., London, 1889, vol. 35, p. 136.

This genus is proposed to include the original type of the genus *Archæocyathus*, Billings. As the change to another type was made by Mr. Billings and no good result can now come from urging the use of the name *Archæocyathus*, as originally proposed, it appears best to accept Dr. Hinde's generic name.

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*Read before the Biological Society of Washington, June 1, 1889.

†Quart. Jour. Geol. Soc., London, vol. 45, 1889, pp. 125–148, pl. 5.

‡Nova Acta Leop. Carol., Deutsche Acad. Naturforscher, vol. 51, pt. 1, 1886.

Nat. Mus. Cat. Invt. Foss., No. 14688.

Coscinocyathus BORNEMANN.

See Zeitschr. d. deutsch. geol. Gesellsch., 1884, p. 704.

Coscinocyathus billingsi Walcott.

Archæocyathus billingsi Walcott, 1886. See Bull. U. S. Geol. Survey, No. 30, p. 74.

By the subdivision of the genus *Archæocyathus* this species is referred to *Coscinocyathus*.

Nat. Mus. Cat. Invt. Foss., No. 15302.

Archæocyathus (A.) dwighti sp. nov.

This species differs from *A.* (*A.*) *rensselaericus* in having in the outer wall a double row of pores and then a raised space upon which no pores have been detected. Interior structure unknown.

LOCALITIES.—Troy, N. Y., and near School-house No. 8, Greenwich, Washington County, New York.

Nat. Mus. Cat. Invt. Foss., No. 18352.

Ethmophyllum meeki sp. nov.

This form differs from *E. whitneyi*, with which it is associated, in having stronger radiating septa, numerous dissepiments, and large pores in the outer wall.

LOCALITY.—Silver Peak, Nevada.

Nat. Mus. Cat. Invt. Foss., No. 18358.

TRAILS, BURROWS, AND TRACKS OF ANIMALS.

As far as known to me there are no true Algæ found in the rocks of the Lower Cambrian. That such forms existed, there can scarcely be any doubt, but, after a careful study of all the reported species, I think that they can be referred to trails of worms or mollusks with more propriety than to the Algæ.

Planolites NICHOLSON.

Planolites Nicholson, 1873. Proc. Roy. Soc. London, p. 289.

Planolites annularius sp. nov.

The cast of a burrowing worm that shows numerous annulations.

LOCALITY.—At the Reynolds Inn locality, of *Olenellus asaphoides*, one mile west of North Greenwich, Washington County, New York.

Nat. Mus. Cat. Invt. Foss., No. 18360.

Planolites congregatus BILLINGS.

Palæophycus congregatus Billings, 1861. Bull. Geol. Survey Canada, p. 2.

This and the following species were referred to the Algæ by Mr. Billings. The reference may be correct, but the species impress me as being the casts of worm-borings; and there is nothing in the specimen to indicate their vegetable origin. This form of cast is found in sandy argillaceous deposits all through the sedimentary rocks.

Type in the Museum of the Geological Survey of Canada.

Planolites incipiens BILLINGS.

Palæophycus incipiens Billings, 1861. Bull. Geol. Survey Canada, p. 3.

This character of worm-boring is common in the sandy shales near Swanton, and at Parker's Quarry, Georgia, Vermont. It is associated with *Olenellus asaphoides.* It is impossible to determine whether the trails on the slate were made by the same species of animal as that making the trails referred to *P. congregatus.* As the two forms have received specific names they are retained for the present.

Type in the Museum of the Geological Survey of Canada.

Helminthoidichnites FITCH.

Helminthoidichnites Fitch, 1850. Trans. N. Y. State Agric. Soc. for 1849, p. 868.
Compare *Nemertites* Nicholson, 1873. Proc. Roy. Soc., London, p. 289.

Helminthoidichnites marinus EMMONS (sp.).

Gordia marina Emmons, 1844. Taconic System, p. 67, pl. 1, fig. 2.—*Idem*, 1846. Agric. N. Y., vol. 1, p. 68, pl. 14, fig. 2.—*Idem*, Hall, 1847. Pal. N. Y., vol. 1, p. 264, pl. 71, figs. 1, 2.
Palæophycus rectus Fitch, 1850. Trans. N. Y. State Agric. Soc. for 1849, p. 862.
Compare *Fucoides flexuosa* Emmons, 1844. Taconic System, pl. v, fig. 3.
Helminthoidichnites tenuis Fitch, 1850. Trans. N. Y. State Agric. Soc. for 1849, p. 866, figure in text.

Dr. Fitch proposed the genus *Helminthoidichnites* for *tracks resembling those of worms*, and figured this species as a very narrow trail on an arenaceous shale. I have seen fragments of a similar trail in the arenaceous slates of the Olenellus zone, and also in the Upper Cambrian shales of the Grand Cañon of the Colorado, Arizona. Those from the latter locality afford the best illustration, and a figure is given of a small portion of the surface of the arenaceous shale, showing the trail upon it.

This type of boring or trail is very abundant in the purple, green, and dark slates, and in the arenaceous shales of the Olenellus zone. Similar trails may have been made by many different species during all the geologic epochs down to the present day.

Nat. Mus. Cat. Invt. Foss., No. 18359.

Cruziana D'ORBIGNY.

Bilobites DeKay, 1823. Am. Lyc. Nat. Hist., New York, vol. 1, pp. 45–49.
Not *Bilobites* Linn., 1775.
Cruziana d'Orbigny, 1842. Voyage d'Amérique Mérid., III.
Rusophycus Hall, 1852. Pal. N. Y., vol. 2, p. 23.

Cruziana sp.?

A careful examination of a large series of specimens of the trails and burrows referred to *Cruziana*, from a single layer of sandstone, leads me to consider that they are all of animal origin, and that many of the so-called species were formed by one species of animal. Also, that specific differences in the animals making them would not generally be shown in the casts of the burrows and trails.

In a paper on the genus *Cruziana* and allied forms I will give my reasons for considering them burrows and trails of animals, and not the casts of fucoids.

Kutorgina labradorica var. swantonensis var. nov.

A comparison of a series of specimens of *K. labradorica*, from Newfoundland, with a series from near Swanton, Vermont, shows constant differences. The striæ on the Swanton shells are finer and more regular, and the valves are less transverse in proportion to the length, and the beak of the ventral valve is less elevated.

FORMATION AND LOCALITY.—Lower Cambian. East of Swanton and Highgate Springs, Vermont.

Nat. Mus. Cat. Invt. Foss., No. 15329.

Obolella atlantica sp. nov.

This is a small species of *Obolella* that occurs in great abundance in Newfoundland and also (less frequently) at North Attleborough, Massachusetts.* It is of the type of *Obolella crassa*, but differs in the details of the interior surface and the average smaller size.

LOCALITIES.—Manuel's Brook, Topsail and Brigus Heads, Conception Bay, Newfoundland.

Nat. Mus. Cat. Invt. Foss., No. 18322.

Camerella minor sp. nov.

Shell small, moderately convex; valves about equal in depth. Ventral valve convex on the umbo, with the beak slightly incurved; cardinal slopes nearly straight from the beak to the rounded sides; the posterior or umbonal third of the valve is usually more or less tumid, a ridge of growth separating it from the anterior portion of the shell. Dorsal valve shorter than the ventral valve; transversely oval, most prominent at the umbo; beak very small and terminating at the cardinal margin.

The casts of the surface show only concentric lines of growth. Usually a marked line or ridge separates the tumid umbonal portion of the shell from the anterior part.

The casts of the interior of the ventral valve have a small pit just in front of the termination of the beak, from which two narrow depressions extend forward and separate off a short, narrow, central ridge and two lateral pointed projections, which extend forward to the line of the base of the central ridge, and are defined, laterally, by sharp, narrow depressions. This form indicates that two lamellæ or plates extended out from the beak on each side of a narrow central depression and then curved outward towards the margin, somewhat as in *Pentamerus.* In one cast two slight ridges extend from the base of the lateral projections a short distance anteriorly. In the interior of the dorsal valve a transverse depression, just in front of the beak, corresponds to a transverse ridge on the interior of the valve.

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* Bull. Mus. Comp. Zool., Harvard College, vol. 16, 1888; Prelim. Descpt. North Attleborough Fossils, p. 27.

Owing to the imperfect casts of the interior the generic reference to *Camerella* is tentative.

In company with Prof. William B. Dwight I found this species associated with heads and fragments of a trilobite that is referred to *Olenellus asaphoides.*

FORMATION AND LOCALITY.—Lower Cambrian. In the quartzitic sandstones of Stissing Mountain, near Stissingville, Dutchess County, New York.

Nat. Mus. Cat. Invt. Foss., No. ——.

Coleoloides gen. nov.

Shell slender, elongate, cylindrical, straight or slightly curved, apparently thin.

Surface marked by very fine, slightly oblique, longitudinal striæ in the only species known.

In form this shell is like that of *Hyolithellus micans*, but the surface markings are unlike those of either *Hyolithellus*, Billings, or *Coleolus*, Hall.

Coleoloides typicalis sp. nov.

Straight, slender, elongate, cylindrical shells that taper so gradually that the diminution in size is only apparent in long pieces of the tube and then observable only by the closest examination. Shell apparently very thin.

Surface marked by very fine, slightly oblique, longitudinal striæ that are a little irregular in their course, as shown by a strong magnifier. The striæ make one revolution around the tube in a length of sixteen diameters of the tube.

The longest specimen found has a length of 23^{mm} and is about one-half a millimeter in diameter. It is broken off at each extremity.

I do not know of any related species.

FORMATION AND LOCALITY.—Same as *Hyolithes terranovicus.*

Nat. Mus. Cat. Invt. Foss., No. 18326.

Hyolithes terranovicus sp. nov.

Form an elongate subtriangular pyramid, gradually and regularly tapering to an acute extremity. The angle of tapering of the dorsal side is very nearly 15°. Transverse section subtriangular or semi-elliptical. Dorsal face slightly convex and curving gently from the extremity to the anterior subspatulate portion. Ventral face strongly and regularly convex transversely; the dorsal and ventral faces meet to form the rounded lateral angles of the shell. Aperture oblique, the margin extending on the dorsal side; the peristome of the ventral side is slightly curved backward. Operculum unknown. Shell thick and strong.

Surface of the shell transversely or concentrically striated; on the dorsal surface the striæ are faintly defined and on the ventral surface strongly marked and also cancellated by raised lines with finer striæ between.

The largest specimen collected has a width of 16^{mm} at the aperture and a length of about 55^{mm} is indicated, the portion preserved being 48^{mm} in length.

I do not know of any identical species, although the surface markings are like those of *Hyolithes nobilis* Barrande.[*]

The presence of a septum near the extremity of the shell is very distinct in one species where the point is broken off.

FORMATION AND LOCALITY.—Lower Cambrian. This species is found in irregular masses of limestone resting on and among the bowlders of gneiss forming the base of the Olenellus zone on Manuel's Brook, Conception Bay, Newfoundland.

Nat. Mus. Cat. Invt. Foss., No. 18319.

Hyolithes similis sp. nov.

Form an elongate subtriangular pyramid, gradually and regularly tapering to an acute extremity. The angle of tapering of the dorsal side is about 13°. Transverse section subtriangular. The ventral angle is sharp and the lateral angles rounded. Dorsal face slightly arched longitudinally, transversely nearly flat, except at the sides, where it curves slightly to meet the two planes of the ventral face, which is strongly angular at the center. Aperture oblique; the peristome is indented at the center of the ventral side and arched over the subspatulate extension of the dorsal face. Operculum unknown. Shell comparatively thin.

Surface of the shell marked by transverse or concentric striæ that arch forward on the dorsal face. The ventral face is further marked by four raised lines on each side of the central angle, and between the raised lines by very fine longitudinal striæ.

The portion preserved of the largest specimen collected has a length of 43^{mm}. When entire it was about 50^{mm} in length; it has a width at the aperture of 13^{mm}, and a depth of 7^{mm}.

In general form this shell is closely related to *H. americanus*. It differs in the strongly marked ventral surface.

FORMATION AND LOCALITY.—Same as *H. terranovicus*.

Nat. Mus. Cat. Invt. Foss., No. 18317.

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[*] Syst. Sil. Boheme, Vol. III, 1867, pl. 13, figs 22–26.

Helenia gen. nov.

Shell an elongate, narrow, flattened, curved tube; transverse section and aperture elliptical. Surface marked by transverse, concentric, imbricating lines of growth.

Helenia bella sp. nov.

Shell an elongate, narrow, flattened, curved tube. The plane of the flattened surfaces is slightly twisted, so as to throw the lateral margins about one-quarter of a turn around and to incline the upper and lower faces nearly 45° at one extremity, as compared with the other. The curvature is nearly semicircular. The cross-section is an elongated ellipse. The form of the aperture of the larger extremity, as indicated by the striæ of growth, has the peristome arching forward on one of the flattened sides and curving slightly backward on the opposite side. As far as I am able to determine the shell was open at the smaller end, as in *Dentalium*, or the extremity was decollated in all the specimens collected. I am inclined to think that it was open at both ends, and hence should be referred to the *Dentalidæ.*

Surface marked by irregular, transverse or concentric, imbricating lines of growth that vary in number and size on the same specimen and in different specimens.

Helenia bella is provisionally referred to the *Dentalidæ* on account of its form and the apparent opening at both extremities.

FORMATION AND LOCALITY.—In a pinkish-colored limestone of Lower Cambrian age, in association with *Hyolithes princeps*, *Olenellus bröggeri*, etc. In a railway cut north of Manuel's Brook, Conception Bay, Newfoundland.

Nat. Mus. Cat. Invt. Foss., No. 18324.

Agnostus desideratus sp. nov.

Cephalic shield about as broad as long, broadly rounded in front, sides curving in very slightly towards the posterior margin; posterior margin sloping obliquely inward from the postero lateral angles to the median lobe. A narrow raised rim extends all around the margin except across the base of the glabella or median lobe. The space between the rim and the glabella is slightly convex. Glabella less than two-thirds the length of the head, narrow, subcylindrical, and with a small tubercle on the posterior third. Surface smooth. A pygidium associated with the head on the same piece of rock has a prominent median lobe bordered by a narrow convex space between it and the marginal rim. The median lobe does not show any indication of lateral or transverse furrows. An elongate median tubercle is the only ornament.

This type of *Agnostus* occurs in the Middle Cambrian zone of the Atlantic Basin as *A. parvifrons*, Linnarsson, and *A. brevifrons*, Linnarsson, of Sweden, and *A. tessella*, Matthew, and *A. umbo*, Matthew, of New Brunswick.

FORMATION AND LOCALITY.—In the upper portion of the Lower Cambrian rocks, a short distance northeast of Salem, Washington County, New York.

Nat. Mus. Cat. Invt. Foss., No. 18327.

Agnostus sp.?

This species is represented by two imperfect heads of the type of *Agnostus fallax* Linnarsson, of the Middle Cambrian of Sweden, or *A. acadicus* Hartt, of New Brunswick. It is found at the same locality with *A. desideratus* and also two miles south-southeast of Granville, in Washington County, New York.

Nat. Mus. Cat. Invt. Foss., No. 18328.

Microdiscus helena sp. nov.

Head convex, bordered all around by a continuous marginal rim that is narrow at the back and sides and broad in front. Three small nodes occur on the anterior lateral portion of the rim, the center one being on the line of the frontal margin of the glabella. Glabella prominent, cylindro-conical, tumid posteriorly; two furrows cross the middle third so as to separate a narrow central lobe, an anterior lobe nearly twice as long as the central lobe, and a tumid posterior lobe that equals the anterior lobe in length. Dorsal furrows strong; the furrow within the margin is broad and well defined all around except at the occipital furrow crossing the glabella, where it is very narrow; it curves backward inside the very narrow rim at this point. Cheeks tumid, and overhanging the outer marginal groove.

The pygidiæ associated with the heads are strongly convex; the median lobe, at the center, is a little more than one-third of the entire width of the pygidium; it is crossed by five transverse furrows that divide it into five segments, and a short, terminal segment just inside the strongly defined marginal groove; dorsal furrows strong; marginal rim narrow; lateral lobes slightly convex, smooth.

The head of this species is related to that of *M. meeki* and *M. lobatus*. The tumid posterior lobe of the glabella serves to distinguish it from them and also all described species. The associated pygidium differs from that of *M. bella marginatus* in being more convex and in having five instead of nine segments in the median lobe.

FORMATION AND LOCALITY.—Lower Cambrian. In a decomposed limestone, 600 meters west of Manuel's Brook, Conception Bay, Newfoundland.

Nat. Mus. Cat. Invt. Foss., No. 18361.

Olenellus HALL.

See Bull. U. S. Geol. Survey, No. 30, 1886, p. 162.

Thinking that *Olenellus* succeeded the genus *Paradoxides* in time, and accepting the interpretation given by Mr. Ford to the embryonic characters of *O. asaphoides*, I argued in favor of the descent of *Ole-*

nellus from *Paradoxides*. It was an error, as the finding of *Olenellus* beneath *Paradoxides* abundantly proves.

The discovery of more perfect specimens of *O. asaphoides* shows that that which I had identified as the facial suture is a raised line in the cast of the interior of the shell that fills a depressed line occupying the position of the suture. I have since found this raised line in many specimens, but in none is there a true suture cutting through the shell, as in *Paradoxides* and most other genera of trilobites.

Subgenus **Mesonacis** WALCOTT.

See Bull. U. S. Geol. Survey, No. 30, 1886, p. 158.

With the discovery of entire specimens of *Olenellus asaphoides*, *O. kjerulfi*, *O. mickwitzia*, and *O. broggeri*, it appears that *Mesonacis vermontana* is to be grouped with them, and all referred to Mesonacis as a subgenus, on account of the peculiar pygidium of *Olenellus thompsoni*, the type of the genus, as compared with that of *O.* (*Mesonacis*) *vermontana*, the type of the subgenus *O.* (*M.*) *vermontana*.

Olenellus (Mesonacis) asaphoides EMMONS (sp.).

See Bull. U. S. Geol. Survey, No. 30, 1886, p. 168.

The discovery of entire specimens of this species shows that it has eighteen segments in the thorax, and a small, transverse pygidium, of the Paradoxides type. On each of the five, short posterior segments of the thorax there is a long, slender spine that projects back over the pygidium. The entire specimens were found at the original locality of the species, near the old Reynolds Inn building, one mile west of North Greenwich, Washington County, New York.

Nat. Mus. Cat. Invt. Foss., No. 18350.

Olenellus (M.) bröggeri WALCOTT.

Olenellus bröggeri WALCOTT, 1888. Name proposed on exhibition of specimens at the International Geological Congress, London. Name used in "Nature," vol. 38, p. 551, 1888.

General form ovate, the length and breadth nearly as 3 to 2 in comparing the length of the entire body with the width of the head. Head broad, semicircular in outline and moderately convex when preserved in the limestone, but very much compressed in the shales. Margin rather broad, but varying in width one-half in different individuals; it is slightly rounded and separated from the frontal limb and cheeks by a shallow groove and narrow, low ridge; posteriorly it terminates in a comparatively short, strong spine. The posterior margin of the head, between the glabella and postero-lateral spine, is broken just within the latter by a deep notch and a short spine that corresponds to the "interocular" spine (Ford) of *Olenellus asaphoides* and the spine at the pleural angles of the posterior margin of the head of *O. kjerulfi*; a low ridge extends from back of the eye, next to the glabella, out to the spine, much as in *O. kjerulfi;* the spine varies in size and direction, from the young individual, where it is directed backward, to the large adult, in which it extends obliquely outward. The under side of the margin forms a broad "doublure." It is slightly arched downward and narrows towards the postero-lateral angles of the head. A slight, curved indentation occurs at the point of attachment of the hypostoma. It is a very common occurrence to find the "doublure" on the reflected under margin lying free from the other parts of the head, in the shale, and with the hypostoma attached. This fact leads to the conclusion that a suture may pass around nearer the frontal margin in the same manner as Holm describes it in *O. kjerulfi.**

Glabella clavate, narrow at the base, reaching its greatest width just back of the anterior termination of the eye lobes; it narrows rapidly towards the rather sharply rounded frontal margin. Three pairs of glabellar furrows occur as shallow depressions, the anterior one opposite the point where the eye lobe merges into the frontal lobe of the glabella; the furrows on the opposite side extend in, but do not unite. Occipital furrow shallow and extending back from each side towards the center. Occipital ring narrow at sides and increasing rapidly in width to the center, where it supports a long, strong spine that curves back over the thorax; none of the specimens show the entire spine, but I think it extends back in the adult fully one-half the length of the thorax. Eye lobes crescentiform, narrow, elongate, arching from the base of the anterior lobe of the glabella, into which they merge, back to a line with the occipital furrow and some distance from the glabella; visual surface unknown. The area between the glabella and eye lobe is slightly depressed, a narrow, shallow furrow extending along the inner edge of the eye lobe. The frontal limb and cheeks slope gently to the ridge within the outer margin. No traces of facial sutures observed, although on some of the casts of the inner side of the shell a depressed line in the shell is indicated by a raised line on the cast. This line follows the direction I should theoretically give to the suture. Hypostoma moderately convex, broad in front and narrowing towards the posterior margin.† One specimen is 18^{mm} across the greatest width, and 12^{mm} across the posterior end. The anterior margin shows a rounded, smooth edge that fits into the slight, curved recess of the "doublure" of the head except laterally, where it extends out to meet the side margin of the anterior wings to form a blunt point; back of the anterior wings the margin is raised to form an elevated rim and then curves under; the rim extends around to and across the posterior margin, becoming most prominent at the postero-lateral angles; the marginal rim is separated from the body by a sulcus that disappears on the anterior wings; the posterior groove, in front of the marginal sulcus, is well defined and arches backward from side to side, although very shallow at the center, and it leaves a prominent ridge on each side between it and the posterior marginal sulcus; the anterior grooves are short and scarcely more than pits just back of the main body of the hypostoma. This hypostoma differs from that of *O.* (*M.*) *kjerulfi* and *O.* (*M.*) *asaphoides* in being narrower anteriorly; more elongate, and with a smooth instead of spinose posterior margin.

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*Aftryck vr. Geol. Foren. i Stockholm. Forhandl., Bd. IX, Haft 7, 1887, p. 16.

†The front margin is the point of attachment to the head and the posterior margin, the margin next to the mouth of the animal and facing the posterior margin of the head.

Thorax with eighteen segments.* Axial lobe convex; the center of each segment bears a short, strong, curved spine, the base of which reaches longitudinally across the segment. Pleural lobes flattened, about three-fifths of the distance from the axial lobe to the outer edge, and then gently curving to the ends of the remaining falcate portion of the pleuræ. The narrow, median pleural grooves extend outward to the beginning of the curvature of the broad falcate extremity of the pleura. Pygidium small, transverse, almost quadrangular in outline.

None of the examples show the details of structure with sufficient clearness to describe them.

The surface of the head and thoracic segments is ornamented with the peculiar, inosculating, fine, raised fretwork that, as far as known, is confined to the genus *Olenellus*.

Dimensions.—*O. bröggeri* and *O. thompsoni* are the two largest species cf the genus yet described. Fragments of *O. bröggeri* now before me indicate a length of 24 centimeters. One head has a length of 8 centimeters. A bed of greenish argillaceous shale 6 inches in thickness is almost entirely formed of fragments of large shells.

The associated fauna includes some well-known Olenellus fauna species and others not heretofore described. As known now it embraces fourteen genera, twenty-three species, and six varieties.

FORMATION AND LOCALITIES.—Lower Cambrian. The best specimens were secured in a reddish-brown argillaceous shale, in a railroad cut, about 1 mile west of Manuel's Brook Bridge, on Conception Bay, Newfoundland. It was also found in the limestones beneath Topsail Head and on Brigus Head, on the same bay; at the base of the Manuel's Brook section, where it ranges through 80 feet of strata, and in the decomposed limestone 400 yards west of the brook, in a railroad cut. Stratigraphically its position is 300 feet beneath the Paradoxides zone in the Manuel's Brook section.

Comparison.—The great occipital spine, small "pleural" spine, broad falcate extension of the pleuræ, and short, transverse pygidium distinguish *O. bröggeri* from *O. kjerulfi* and *O. mickwitzia* of Europe. With the exception of the form of the pleuræ the same characters separate it from *O. asaphoides*, *O. thompsoni*, *O.* (*M.*) *vermontana*, and *O. gilberti*. The head of *O. iddingsi* is quite distinct.

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* A note made in the field records eighteen segments in the only entire specimen found. Owing to fragile, decomposed rock the pygidium and five segments of this specimen were ground to powder in transporting the large slab which contained it over the rough roads to St. John's.

The species of *Olenellus* found in Shropshire, England, and given the provisional name of *O. callavei* by Prof. Charles Lapworth,* is very closely allied to, if not identical with, *O. bröggeri*.

Nat. Mus. Cat. Invt. Foss., No. 18331.

Avalonia gen. nov.

Avalonia manuelensis sp. nov.

As the types of the genus and species are the same, one description only will be given.

The genus and species are founded on the central portions of the head of a trilobite that differs from any described species known to me in the form of the dorsal and ocular furrows and fixed cheek.

Head, semicircular, moderately convex. Glabella, subquadrangular, slightly convex, sides parallel; three pairs of narrow, shallow furrows divide the glabella into four subequal lobes; the two posterior furrows extend about one-third the distance across the glabella; the anterior pair are very short and indistinct. Occipital ring narrow, transverse, and separated from the glabella by a strong furrow. The dorsal furrows are well-defined grooves, extending from the posterior margin to the frontal rim. Fixed cheeks, broad, very slightly convex; the anterior fourth is separated by a narrow furrow that starts, at a slight deflection, in the glabellar suture, and extends outward and backward to the facial suture, where it passes into what, in many of the trilobites, is the furrow or eye lobe. This furrow or groove occupies the position of the ocular ridge, from the dorsal furrow to the facial suture, in the genus *Ptychoparia*. The extension of the furrow backward joins the one extending from the occipital furrow outward, just inside the posterior margin. Frontal margin of medium width, and separated from the glabella by a strong furrow; posterior rim of head narrow, rounded, and separated from the fixed cheek by a strong furrow that unites at the postero-lateral angle with the furrow on the outer edge of the fixed cheek. The eye lobe is not distinctly shown in any of the specimens. If present it is probably long and narrow, as in the genus *Centropleura*, of Angelin, or *Anopolenus*, of Salter.

Free cheeks unknown. From the form of the fixed cheeks they were evidently long and narrow.

The broad fixed cheek with its furrows on the lateral and posterior margins recalls the cheek of *Anopolenus*, while the quadrangular glabella is that of the genus *Olenoides*. As far as known to me the depressed ocular furrow is peculiar to the genus.

FORMATION AND LOCALITY.—Lower Cambrian. In railway cut, about 600 meters north of Manuel's Brook, Conception Bay, Newfoundland.

Nat. Mus. Cat. Invt. Foss., No. 18333.

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* Geol. Mag., new ser., Dec. III, vol. 5, 1888, p. 485.

Zacanthoides eatoni sp. nov.

This species differs from *Zacanthoides levis* in having the glabella clavate instead of subcylindrical; also in the more elongate form of the head. Pygidium unknown.

FORMATION OF LOCALITY.—Upper portion of the Olenellus zone in Washington County, New York.

Nat. Mus. Cat. Invt. Foss., No. 18362.

Solenopleura harveyi sp. nov.

Of this species only the central portions of the head have been found. These belonged to a very large species, as the heads vary in length from 40^{mm} to 45^{mm}.

The glabella is conical, about twice as long as the width, and separated from the slightly rounded occipital ring by a shallow furrow. Two very shallow furrows extend obliquely backward from the dorsal furrow on each side; they scarcely indent the smooth, convex surface of the glabella; an anterior pair of furrows are indicated by a short, shallow depression on a line with the anterior margin of the eye lobe; the glabella is separated from the fixed cheek and frontal limb by a shallow groove on the sides, and in front by the difference in the slope of its surface and that of the frontal limb. Frontal limb broad and gently convex down to the slight depression separating it from the relatively broad, depressed margins; laterally it passes into the broad, smooth, free cheeks. The frontal margin of the eye lobe is at about half-way between the posterior and anterior margins of the head; it is of medium size; a well-defined ocular ridge extends obliquely backward across the fixed cheek from the glabella to the eye lobe. The posterior margin of the head is separated from the main part of the fixed cheek by a broad, shallow groove.

With the material at hand for study the species is provisionally referred to *Solenopleura.*

The specific name is given in honor of Rev. M. Harvey, the author of the best work yet published on Newfoundland, and the enthusiastic helper of every scientific student who visits the colony.

FORMATION AND LOCALITY.—Lower Cambrian. About 600 meters north of Manuel's Brook, Conception Bay, Newfoundland.

Nat. Mus. Cat. Invt. Foss., No. 18338.

Solenopleura howleyi sp. nov.

A second large species is referred to *Solenopleura.* It is associated with *S. harveyi,* and is much nearer the type of the genus *Solenopleura* than the latter species. It is known only by the central portion of the head and a few segments of the thorax.

The glabella is elongate, conical, convex, and marked by three pairs of shallow furrows that penetrate obliquely backward one third the distance across the glabella; occipital ring rounded and well defined from the glabella by a deep furrow; a small node occurs at the center; the glabella rises rather abruptly from the broad, slightly convex fixed cheeks and narrow, frontal limb, a shallow, dorsal furrow serving to give it more prominence. The broad, fixed cheeks are crossed by a narrow, ocular ridge that passes obliquely outward and backward from a point on the dorsal furrow opposite the anterior margin of the eye lobe, where it unites with the outer rim of the rather large, prominent eye lobe. Anterior rim of the head of medium width, rounded and separated from the frontal lobe by a narrow, distinct furrow. The posterior rim or margin is more rounded than the anterior, and the furrow defining it is deeper. The short, postero-lateral limb of the fixed cheek slopes abruptly down to its half-truncated margin.

Surface strongly granular or pustulose.

FORMATION AND LOCALITY.—Associated with *Solenopleura ? harveyi.*

The specific name is given in honor of Mr. James P. Howley, geologist of Newfoundland.

Nat. Mus. Cat. Invt. Foss., No. 18336.

SMITHSONIAN INSTITUTION, *June* 1, 1889.

NEW NORTH AMERICAN ACRIDIDÆ, FOUND NORTH OF THE MEXICAN BOUNDARY.

BY

LAWRENCE BRUNER.

(With Plate I.)

During the early part of 1884 Dr. C. V. Riley and the writer began the preparation of a conjoint Monograph of North American Acrididæ. For various reasons the publication of this work has been delayed, and, at the suggestion of Dr. Riley, and as a result of that conjoint work, the following new North American Acrididæ are herewith characterized in advance, in order that others who may be desirous of studying the same family of insects can have the benefit of the undescribed material in this group contained in the collections of the National Museum. This material has been steadily increasing ever since the publication of Dr. Thomas' Synopsis of North American Acrididæ by the United States Geological Survey. At present this collection contains typical specimens of nearly all of the described forms, besides many that are new to the country north of the Mexican frontier. Dr. Riley will probably soon publish descriptions of the new species belonging to the genera *Melanoplus*, *Pezotettix*, *Hesperotettix* and allies, to which he has paid especial attention on account of their economic relations to agriculture. The writer wishes here to acknowledge his aid in different ways while engaged on the work, and for having the accompanying illustrations prepared.

In the preparation of the present paper no special efforts have been made towards a natural classification of the species represented by the material herein described. The conocephalids have, however, been placed together—an arrangement which seems more natural than that sometimes adopted heretofore by writers treating of the family of locusts. The division into sub-families is that followed by the more recent European specialists.

The following new species and genera are described in the present paper:

Acridinæ.
Mesops cylindricus.
Pyrgomorphinæ.
Dracotettix gen. nov.
Dracotettix monstrosus.
Tryxalinæ.
Ochrilidia crenulata.
cinerea.
Mermiria texana.
maculipennis.
Syrbula acuticornis.
Eritettix gen. nov.
Eritettix variabilis.
abortivus.
Boötettix gen. nov.
Boötettix argentatus.
Pedioscirtetes pulchella.
Œdipodinæ.
Psoloessa Buddiana.
(?) eurotiæ.
Arphia Saussureana.
Aulocara (?) Scudderi.
Mestobregma pulchella.
Conozoa texana.
albolineata.
Koebelei.
Trimerotropis cyaneipennis.
azurescens.
bifasciata.
californica.
modesta.
thalassica.
(?) pacifica.
perplexa.
Circotettix lapidicolus.
shastanus.
Œdipoda (?) occidentalis.
Thrincus aridus.
maculatus.
Haldemanella Saussure.
Haldemanella robusta.

Sub-family ACRIDINÆ.

Mesops cylindricus sp. nov.

Very similar to *M. wyomingensis* Thos. in structure and general appearance, but differing from that insect in color and its considerably larger size.

Head long, considerably longer than the pronotum; the face very oblique, straight; cone of the vertex horizontal, the margins raised, the center sulcate and furnished with a well defined median carina in both sexes; frontal costa expanding below, sulcate to the labrum. The sides sharply defined. Antennæ ensiform, triquetrus, rather heavy, and somewhat exceeding the length of head and pronotum combined; occiput gently rounded, slightly expanding posteriorly. Pronotum subcylindrical. The anterior edge slightly expanding, lower lateral edge a very little upwardly arcuate in the middle; the anterior and posterior extremities gently rounded, median carina distinct throughout, most prominent on last lobe, which is slightly granulate; last transverse impressed line faint, to the rear of the middle. Tegmina and wings very delicate, a little more than one-half as long as the abdomen, and furnished with few veins, their apices rounded. Posterior femora slender, gently and evenly tapering, about two-thirds the length of the abdomen in both sexes. The abdomen rather long and cylindrical, in the male terminating with a long wedge-shaped last ventral segment or process. Valves of the female ovipositor very short and nearly obscured by the overlapping anal processes.

General color a nearly uniform reddish-brown or grayish-fawn color, marked only by a bright white line reaching from the base of the antennæ along the lower edges of the pronotum to base of middle pair of legs; antennæ, face, and eyes ferruginous.

Length of body, ♂, 26^{mm}, ♀, 34^{mm}; of antennæ, ♂, 11^{mm}, ♀, 13^{mm}; of pronotum, ♂, 35^{mm}, ♀, 5^{mm}; of tegmina, ♂, 12^{mm}, ♀, 14^{mm}; of hind femora, ♂, 10.35^{mm}, ♀, 13^{mm}.

HAB.—Valentine, Nebr., along the north side of Keya Paha Creek, also on the bluffs south of Chadron, Nebr., (L. Bruner).

This very interesting grasshopper was seen for the first time, by me, during the month of August last, while on a collecting trip into the northwestern part of the State. Belonging, as it does, to a sub-family of locusts that are particularly noted for their mimicry to certain forms of vegetation, it can be readily seen how it has so long escaped the eyes of collectors. This insect lives upon the stems of several species of the tall grasses of that region, to which it clings so closely that it is difficult to see it unless first disturbed. Even then it sometimes succeeds in eluding its would-be captor. Its actions are slow, as would naturally be supposed from the form of its jumping legs and the smallness of its winge. It is more of a climber or walker than a jumper.

Sub-family **PYRGOMORPHINÆ**.

Dracotettix gen. nov.

Composed of rather large and clumsy insects of dull colors, in which the tegmina and wings are somewhat shorter than the abdomen. The vertex of the head, broad and projecting; the pronotum large, cristate, and quadrilobed; the prosternum strongly spined, and the legs as in the *Eremobinæ*. Females fully twice the size of the males.

Entire surface of body and limbs very rough, having a granular appearance. Antennæ rather short, crassate, subtriquetrous, 17-jointed, the joints somewhat flattened, punctate, the apex blunt. Vertex broad and projecting considerably in front of the eyes, of nearly equal width throughout, almost horizontal, the lateral edges projecting, but gently sulcate, furnished in the middle with a blunt, longitudinal carina; the fastigium broadly rounded; lateral foveolæ elongate, scarcely sulcate; frontal costa narrow and very prominent above, suddenly contracting to ordinary height at the ocellus, where the walls are deeply cut by a profound transverse sulcus, rather deeply sulcate throughout, the walls below the ocellus slightly divergent and quite heavy; lateral facial carinæ moderately prominent and united below by a transverse carina with the carina of the frontal costa, making two walled enclosures. Eyes, moderately large and rather prominent, sub-globular. Pronotum large and broad, with strongly marked lateral carinæ, which are evenly divergent posteriorly, the disk nearly flat, the front and back edges angulate, the latter greatly prolonged, as in the genus *Haldemanella;* the median carina tectiform, cristate, strongly quadrilobed; posterior lateral edges oblique, the lower angle rounded. Tegmina and wings somewhat abbreviated, the axillary field in the latter very large, especially in the males, where it occupies fully one-third of the entire area. Posterior femora moderately robust, with the upper and lower carinæ but little elevated; posterior tibiæ gently tortuous; the spines few, stout, and those on the inner edge nearly twice the length of those outside and curved; tarsi of anterior pair of legs very short; pulvilli between claws very minute, almost obsolete. Abdomen strongly compressed, tectiformly carinate, tapering rapidly near its apex; the last ventral segment of male conical; the supra-anal plate triquetrous, the upper edge narrowly but quite deeply sulcate. Prosternal spine quite large, pyramidal, the front edge flat, the hind edge rounded.

As indicated from the above description and by reference to the figure of *D. monstrosus*, it will at once be seen that the insects comprising the genus *Dracotettix* form a very distinctly marked group among the Acridians of the world. Like most all of the other large robust forms of the family, these locusts are also inhabitants of semi-desert, or desert-like regions, for the rigors of which they are eminently fitted.

Their dull color is protective, their shield-like pronotum and leathery tegument a safety against the attacks of lizards and other reptiles, while their rugosity is in unison with their surroundings. Being denizens of a rough country their general "make-up" partakes of a like rough nature. Like some of the reptile forms that frequent these regions these locusts also bear a very striking resemblance to the pictured dragons of mythological lore, hence the name "dragon locust."

Dracotettix monstrosus sp. nov. [Pl. I, Fig. 1.]

Dull, dirty white, gray and brown, with a few flecks of black along the carinæ of face, pronotum, and posterior femora; the latter black inside; posterior tibiæ and tarsi red inside, gray outside. Antennæ reaching only to last transverse sulcus of pronotum.

Vertex between the eyes about as broad as their longest diameter (♂) or fully twice as broad as their shortest diameter (♀), horizontal, gently tapering anteriorly, the fastigium broadly rounded, the median carina rather blunt but distinctly visible throughout, the lateral walls converging posteriorly to the hind edge of the eyes, where they suddenly approach nearly to the median carina; occiput furnished with two supplementary carinæ or rugosities, commencing at the upper posterior edges of the eyes and reaching backwards and inward until they are lost from view beneath the front edge of the pronotum. Face in front and on cheeks rugose. Pronotum large; the surface tuberculate, granulate; the crest or median carina tectiform, high; the last transverse sulcus a little in advance of the middle, the anterior portion trilobed, the three lobes together arched, the front one nearly or quite as long as the other two; the crest on the posterior lobe a little lower and evenly arched, as in the genus *Acrolophitus*, lateral carinæ continuous, increasing in size backwards, and forming overhanging blunt walls to the lateral lobes; posterior extremity acute-angled, with the tip upturned and strongly marginate. Tegmina lanceolate-ovate, in the female about half as long, and in the male only a trifle shorter than the abdomen; wings shorter than the tegmina, the humeral field very narrow, the axillary equal to the post-axillary or radial field and bordered with very heavy veins, like this portion of the wing in *Rhomalea* and *Tæniopoda*, and like these are evidently used as musical organs.

General color, dirty grayish-white, with a slight rusty tinge to the sides of the pronotum and thorax. Lower half of tegmina brown. Inner face and lower sulcus of posterior femora black nearly to the knee; inner edge of posterior tibiæ bright vermilion, outside grayish-white. Carinæ of face, pronotum, and posterior femora flecked with dark brown and black. Tips of antennæ infuscated, remainder grayish. Spines of posterior tibiæ testaceo-cinereous in the middle, their bases and tips black.

Length of body, ♂, 27^{mm}, ♀, 45^{mm}; of antennæ, ♂, 8^{mm}, ♀, 11^{mm}; of pronotum, ♂, 10.75^{mm}, ♀, 15.5^{mm}; of tegmina, ♂, 14^{mm}, ♀, 17^{mm}; of hind femora, ♂, 14^{mm}, ♀, 19^{mm}; width of pronotum, ♂, 7^{mm}, ♀, 10^{mm}.

Described from two specimens, male and female.

HAB.—Los Angeles, Cal., March 5 and 27 (D. W. Coquillitt).

Sub-family TRYXALINÆ.

Ochrilidia (?) crenulata sp. nov.

Related to *O. occidentalis* (*Stenobothrus occidentalis* Thos.), from which it differs in its smaller size, shorter occiput, and in its markings.

Occiput rather short and slightly rounding; the vertex between the eyes about as wide as the length of the basal antennal joint, the front margined by a blunt carina, forming at the fastigium a right angle, with the apex, gently rounded; lateral foveolæ missing; frontal costa prominent above, where it is very narrow, widening evenly below, sulcate throughout, the literal walls sharp. Eyes pyriform, not prominent. Face straight, very oblique. Pronotum short, nearly as broad as long, the lateral carinæ greatly bowed, faint; median carina visible throughout, severed about the middle by the last transverse impressed line; anterior edge slightly ascending upon the occiput; posterior edge broadly rounded. Tegmina narrow, the anterior edge bowed, the posterior edge straight; the veins of the disk not uniting and forming cells. Posterior femora slender, in the female just reaching, but in the male surpassing, the tip of the abdomen about one-third of their length. Interior apical spines of the posterior tibiæ fully twice as long as those on the outside, the lower one much the longest. Antennæ long, with the basal joints somewhat flattened, and the apex acuminate.

General color light testaceous, striped, and marked with brown. Frontal costa and a quite broad median line reaching from the fastigium to the front edge of the pronotum, a similar one extending from the lower edge of each eye down the face to the corner of the clypeus; in some specimens this line is separated into two by the very narrow yellow front border of the cheeks; there is a third line or band of the same color directed backwards from the middle of the eyes, widening as it goes, and continued upon the sides of the pronotum, of which it covers a little more than the upper half. This last band is partially interrupted on the front edge of the pronotum by a pointed streak of yellow which reaches nearly to the lateral carinæ. Disk ferruginous, with two lateral triangular brown spots on the posterior lobe, that appear as if separated from the coloring of the sides by the narrow yellow lines along the carinæ. Tegmina with the disk brown to the apex, the anterior edge of which is much the darkest and deeply crenulate or waved, remainder grayish, becoming somewhat transparent apically. Wings pellucid, with the veins and nerves of the apical third infuscated. The posterior femora, with the upper carina and the upper half of the outer face brown, also with indications of two dusky bands on the upper edge. Posterior tibiæ dirty grayish-yellow, becoming infuscated apically. Venter dull yellow. Antennæ testaceous, in some specimens inclining to lavender.

Length of body, ♂, 13^{mm}, ♀, 18.5^{mm}; of antennæ, ♂, 9^{mm}, ♀, 7^{mm}; of pronotum, ♂, 2^{mm}, ♀, 2.92^{mm}; of tegmina, ♂, 9^{mm}, ♀, 12.5^{mm}; of hind femora, ♂, 8.6^{mm}, ♀, 11^{mm}; of hind tibiæ, ♂, 7.65^{mm}, ♀ 10^{mm}.

HAB.—Silver City, N. Mex. (Chas. H. Marsh); Yellowstone Valley, Mont., Helena and Fort Benton, Mont., and from several points in northern Wyoming, southwest Dakota, northwest Nebraska (Bruner).

This trim little locust is quite common throughout the regions above indicated, where it is to be met with among the short bunch grasses of the plains; and especially is it partial to localities where the surface is somewhat strewn with gravel and small stones.

Ochrilidia (?) **cinerea** sp. nov.

Somewhat larger than *O. crenulata* and *O. occipitalis*. Dull, dirty, grayish-yellow, with the tegmina evenly mottled throughout.

Differing from the species just described in the somewhat longer, more acute vertex, which expands a little in advance of the eyes and is quite deeply hollowed; also in the presence of rather plain, elongate, triangular lateral foveolæ. Pronotum as in *occipitalis*. Tegmina with the discal cells closed at about two-thirds the distance to the apex, and the marginal field somewhat expanding on the basal half. Antennæ a little heavier and more flattened than in *occipitalis*. Posterior femora as in that species to which it is most closely related.

General color cinereo-testaceous, with faint indications of the brown markings of the head and thorax, as seen in the other two species. Tegmina evenly mottled throughout, with small fuscous quadrate spots. Posterior femora crossed by two faint, dusky, oblique bands, plainest above. Posterior tibiæ testaceous, the spines black-tipped. Antennæ grayish-brown.

Length of body, ♂, 15.5^{mm}, ♀, 21^{mm}; of antennæ, ♂, 8–10^{mm}, ♀ 9^{mm}; of pronotum, ♂, 2.45^{mm}, ♀, 3.35^{mm}; of tegmina, ♂, 11.5^{mm}, ♀, 14^{mm}; of hind femora, ♂, 9.25^{mm}, ♀, 11.2^{mm}; of tibiæ, ♂, 8^{mm}, ♀, 10^{mm}.

HAB.—Fort McKinney, Wyo., Birch Creek, Idaho, and Burleigh County, Dak. (Bruner), northwest Nebraska (Bruner).

This and *occipitalis* are frequenters of the mountain slopes and foothills, and especially so where these localities are somewhat sandy. Like *crenulata*, they are most partial to partly bare surfaces, and are very active in their movements. The present species reminds one not a little of the different members of the genus *Mermiria* in its general appearance and actions.

Mermiria texana sp. nov. [Pl. I, Fig. 11.]

A rather robust species with comparatively short hind legs. Dark brown, testaceous, and dirty white or pale lavender.

Head moderately short, the vertex short (though not quite so short as in *M. bivittata*), narrow, rounded in front, with but very slight traces of raised lateral carinæ and no median carina; frontal costa plainly visible throughout but not prominent, straight, narrow above and gradually widening below (♂), or with the sides parallel (♀), sulcate throughout. Eyes large and moderately prominent, elongate pyriform—as long as that portion of the cheeks immediately below them. Antennæ rather narrow, reaching one-third of their length beyond the hind extremity of the pronotum. Pronotum short and broad, the sides nearly parallel, rounded above on the anterior and nearly flat on the posterior lobe, which is rather coarsely punctate; median carina quite prominent, severed back of the middle by the last transverse impressed line; lateral carinæ nearly obsolete; anterior margin slightly concave; posterior margin very broadly rounded. Tegmina broad, the apex rounded, with the veins quite prominent, reaching beyond the tip of the body in both sexes. Posterior femora shorter and heavier than usual, not quite reaching (♀) or a trifle surpassing (♂) the tip of the abdomen; tibiæ heavy, with rather short, stout spines. Last ventral segment of the male abdomen less elongate than in *M. bivittata* and *M. alacris*.

General color light grayish-brown, heavily lined and marked with dark brown, and testaceous. A broad brownish band, commencing at the tip of the vertex and extending backwards along the middle of the occiput and pronotum to the middle of the dorsal edge of the closed tegmina; another reaching from the eyes backwards along the upper half of the sides of the pronotum upon the tegmina, the entire sides of which (save a narrow costal line of testaceous) it covers. These lines are darkest on the pronotum, where the color is nearly black. There is also a continuation of this color on the upper portion of the frontal costa and also a narrow line down the inner edges of the lateral facial carinæ, These brown lines are much darker in the male, where the antennæ and the anterior and middle legs are also of this color. The dark lines are broadly bordered with testaceous, of which color are also the antennæ of the female, a line along the upper and lower edges of the posterior femora, and also the tarsi of the posterior pair of legs. There are also lines of the brown along the upper carina and upper edge of the outer face of the posterior femora, which terminate at a rather wide preapical annulus of the testaceous color. Posterior tibiæ bright red, in some specimens inclining to purplish at the immediate base and towards the apex; the spines black-tipped.

Length of body, ♂, 27–29^{mm}, ♀, 43^{mm}; of antennæ, ♂, 14^{mm}, ♀, 16^{mm}; of pronotum, ♂, 4.85^{mm}, ♀, 6.45^{mm}; of tegmina, ♂, 23–26^{mm}, ♀, 35^{mm}; of hind femora, ♂, 15.5–17^{mm}, ♀, 21–24^{mm}; of hind tibiæ, ♂, 14.5–16^{mm}, ♀, 20–21–5^{mm}.

HAB.—El Paso, Tex.; also Lerdo, in the State of Durango, Mexico, during November (L. Bruner).

This locust was only met with among the *sisal* producing plant (a sort of Agave, I believe) growing upon the rocky hills back from the rivers. It is very active, wild, and difficult to capture, and when disturbed flies great distances, invariably alighting among the thorny, rigid, and fleshy leaves of the plant above referred to. Whether or not it feeds upon the leaves of this plant I was unable to ascertain.

Mermiria maculipennis sp. nov.

Large and robust, with the tegmina more or less mottled. Testaceous and brown.

Head large and wide, the occiput shorter than in *M. neo-mexicana* and *M. alacris;* face straight, less oblique than in those species; eyes large, quite wide, and prominent; vertex not quite so wide as in the species just mentioned, short and broadly rounded in front, not sulcate; lateral foveolæ lunate and small; frontal costa moderately prominent above, slightly widening and fading below, gently sulcate above the ocellus (♀) or throughout (♂). Antennæ long, of medium width near the base, apex acuminate. Pronotum broad, without lateral carinæ, subcylindrical above, the posterior lobe expanding; anterior margin nearly straight, posterior margin subangulate. Tegmina extending just beyond the tip of the abdomen, with the nerves and veins prominent. Posterior femora robust, reaching past the tip of the body and wings in both sexes. Posternal spine quadrate, short, bluntly acuminate, directed gently to the rear.

Dull testaceous, in some specimens inclining to ferruginous, with the usual dark band along the sides of the head and pronotum, which extends upwards upon the edges of the disk of the latter; occiput furnished with two rather narrow, somewhat interrupted central brown stripes inclosing a still narrower one of yellow. Median carina of the pronotum sometimes occupied by a narrow brown stripe. Tegmina with a subcostal and dorsal yellow lines, remaining portion brownish cinereous, becoming translucent beyond the basal third; veins and cross-veins brown. There are also a number of rather large dim fuscous blotches arranged along the middle field and a few smaller ones above and below. Posterior femora with the upper half of the outer face, together with the upper inner face, dusky; there is also a row of small dark spots along the lower outer edge; apex fuscous above; posterior tibiæ light red, inclining to pinkish in the female, their spines black on the outer half. Antennæ testaceous, lightest in the female. Besides the markings already mentioned there are, in some specimens of the female, small cresent-shaped black marks on the face below the ocellus, and interrupted bands of brown reaching from the lower edge of the eyes down the cheeks. Also a dim broad band just below the lower lateral edges of the pronotum.

Length of body, ♂, 36^{mm}, ♀, 46–52^{mm}; of antennæ, ♂, 21^{mm}, ♀, 15^{mm}; of pronotum, ♂, 5.85^{mm}, ♀, 8^{mm}; of tegmina, ♂, 27^{mm}, ♀, 37^{mm}; of hind femora, ♂, 21.5^{mm}, ♀, 31^{mm}; of hind tibiæ, ♂, 21^{mm}, ♀, 29^{mm}.

HAB.—San Antonio, Tex., in June (M. Newell); Carrizo Springs, Dimmit County, Tex., also in June (A. Wadgymar).

Syrbula acuticornis sp. nov.

Very closely resembling *S. admirabilis* (Uhl.) in its general appearance and size, but differing from that species in its somewhat slenderer form and in several other respects.

Antennæ acuminate, the basal joints flattened and wider than long, reminding one not a little of the different members of the genus *Mermiria*, not quite as long as the head and pronotum combined. Vertex between and in advance of the eyes as in *admirabilis*, but with the carinæ much more strongly developed; the lateral foveolæ inconspicuous; frontal costa of only medium width, the sides straight and diverging but little towards their lower end, continuous to and upon the clypens, sulcate at upper end and below the ocellus; lateral facial carinæ straight and nearly parallel with those of the frontal costa; eyes similar in form to those of *admirabilis*, but larger and slightly more prominent than there. Pronotum with the lateral carinæ greatly arcuate, heavier and more prominent than the median, all three severed by the single transverse impressed line upon the disk a little back of the middle, the lateral lobes slightly deeper than in the other species. Tegmina and wings as in *admirabilis*. Posterior femora moderately heavy, reaching slightly beyond the tip of the abdomen.

General color grass-green, marked upon the pronotum and tegmina as in *admirabilis*, with this possible difference, that these members, together with the wings, are more deeply infuscated here than there.

Length of body, ♀, 34^{mm}; of antennæ, 8.5^{mm}; of pronotum, 5.75^{mm}; of tegmina, 24–25^{mm}; of hind femora, 22^{mm}.

Described from 3 female specimens. Male not known to me.

HAB.—Southwestern Texas (F. G. Schaupp).

Eritettix gen. nov.

Related to the genera *Oxycoryphus*, and *Stenobothrus* of Fischer in the general make up of the body; but differing from these in having the occiput tricarinate, which carinæ are continuous upon the disk of the pronotum as the median and two supplementary carinæ, these latter about midway between the median and lateral carinæ which are common to all the other genera of the sub-family Truxalinæ. Vertex nearly horizontal, only moderately broad, increasing but little and extending in advance of the eyes about as far as the distance which separates them, the apex roundly angulate. Antennæ with the joints more or less flattened towards the base, the apex clubbed to bluntly acuminate, of moderate length, not reaching the posterior extremity of the pronotum; face oblique, slighty arcuate; the frontal costa prominent and broad, with its sides greatly divergent below, shallowly sulcate at the ocellus; the lateral facial carinæ rather faint, arcuate. Pronotum short to medium in length, somewhat tumid at the sides below, the front edge nearly straight, the posterior edge roundly angulate above; median carina rather prominent, straight; the lateral but gently (*carinatus*, *tricarinatus*, *virgatus*, and *variabilis*) or considerably arcuate (*abortivus*); the last transverse impressed line faint, nearly in the middle. Tegmina from one-half to as long as the abdomen, when the latter just reaching (♀) or slightly surpassing the tip of the abdomen (♂). The anterior or costal area of the former but gently inflated. Valves of ovipositor short and blunt. Posterior femora stout, surpassing the tip of the abdomen.

Second internal tibial claw almost twice as long as the first. The two sexes very unequal in size, the female being much the largest.

All the species of this genus of locusts, so far as I am aware, live through the winter as larvæ or pupæ, and mature very early in spring, in that respect reminding one of the genera *Chortophaga*, *Chimarocephala*, *Psoloessa*, and a few of the representatives of the genera *Hippiscus* and *Arphia* among the *Œdipodinæ* and the *Tettiginæ*.

Eritettix variabilis sp. nov.

Very similar in size and general structure to *Stenobothrus carinatus* Thos., and like that insect also very variable as to color. In this latter species the antennæ are acuminate instead of clavate, the vertex is narrower between the eyes, and the supplementary carinæ of the pronotum and occiput are less prominent than there.

Size and color of *carinatus*.

HAB.—Silver City, N. Mex., in the month of May (Chas. H. Marsh).

Eritettix abortivus sp. nov. [Pl. I, Figs. 8, 9.]

Short and compact with aborted wings. In general appearance resembling the genus Oxycoryphus, but belonging with *St. carinatus*, *St. tricarinatus*, and *St. virgatus* in a distinct genus; very variable in color, ranging from bright grass-green to dull wood-brown.

Vertex triangular, about as wide as the smaller diameter of the eyes; the margins but gently raised, furnished with a well-defined longitudinal carina, which, with two supplementary carinæ, extend backward across the occiput to the front edge of the pronotum, where the lateral supplementary ones are more or less interrupted, but appear again upon the disk of the posterior lobe. Face oblique, nearly straight, the frontal costa prominent, evenly widening below where it reaches the clypeus, sulcate at the ocellus (♀) or from the antennæ nearly to the lower end (♂); lateral facial carinæ minute, straight, antennæ with the joints slightly flattened but not ensiform. Pronotum short and rather broad, the median carina very prominent; lateral carinæ much curved, the disk provided with a pair of supplementary carinæ, one on either side and parallel to the median, as mentioned above; anterior edge nearly straight, posterior edge broadly angulate; posterior impressed line back of the middle, faint. Tegmina abortive, furnished with rather prominent nerves, acuminate, not quite (♀) or a little more than half as long as the abdomen (♂). Posterior femora large, compressed, just reaching (♀) or considerably surpassing the tip of the abdomen (♂); posterior tibiæ with the middle terminal claw more than twice as long as the others.

Very variable in color, like the other species of the genus, varying from dull wood-brown to nearly wholly green. Lateral carinæ of the pronotum, together with a median lateral line, of bright yellow, also the disk and rather wide lower lateral border of testaceous, a dusky band on disk, just inside of lateral carinæ, crossing to outside in middle, and recrossing at hind extremity; also one on middle of sides, somewhat interrupted near the hind margin. Antennæ ferruginous or darker.

Length of body, ♂, 9^{mm}, ♀, 16^{mm}; of antennæ, ♂, 3.5^{mm}, ♀, 4^{mm}; of pronotum, ♂, 2.3^{mm}, ♀, 3.1^{mm}; of tegmina, ♂, 4.5^{mm}, ♀, 4.25^{mm}; of hind femora, ♂, 7^{mm}, ♀, 9^{mm}.

HAB.—Central Texas (Schaupp); Washington County, Texas (Bruner).

Found quite plentifully in closely grazed pastures during the month of April, when the sexes were taken *in coitu*.

Boötettix gen. nov.

Comprising insects of medium size, somewhat related to *Pedioscertetes* Thos., in the form of the pronotum and posterior femora, but otherwise approaching *Gomphocerus* and *Stenobothrus*. Heads of medium size, occiput rather short; the eyes moderately prominent, rounded behind, nearly straight in front; vertex broad, nearly horizontal, triangular, shallowly sulcate, with a minute median longitudinal carina, the lateral margins sharp, fastigium very pointed; face rather oblique, straight, the frontal costa pointed above, broadest between the antennæ, plain, fading near the clypeus; lateral facial carinæ parallel in the male, gently divergent in the female. Antennæ about 20-jointed, slightly flattened near the base and apex, the latter pointed; in the female very short, reaching only to the front edge of the pronotum, in the male a little beyond its posterior extremity. Pronotum rather short and moderately broad, depressed in the middle, rounded above on the anterior lobe, from which point it expands rapidly posteriorly; lower lateral edges nearly straight, the sides deep, the lower posterior angle square, the point rounded; anterior edge slightly rounded, posterior margin broadly rounded. Tegmina and wings reaching beyond the tip of the abdomen in both sexes, rather narrow in the female, the costal field considerably dilated in the male as in *Chloëaltis* and *Arcyptera*. Posterior femora long and slender, reaching (♀) or extending past the tip of the body (♂). Prosternum armed with a large, very low, quadrate process.

Boötettix argentatus sp. nov. [Pl. I, Figs. 4, 5.]

Light green marked with deep ferruginous, brown and black. A series of silvery blotches along the sides and beneath is a distinguishing character. Body and limbs hirsute. About an inch in length.

Vertex between the eyes quite broad, nearly as wide as the shortest diameter of the eyes; fastigium pointed, triangular, very shallowly sulcate and furnished with a minute central longitudinal carina, lateral margins sharp, abrupt; lateral foveolæ elongate, narrow, fading away along their lower edge where the surface is rather coarsely granulate; lateral ocelli very large and situated lower down the face than ordinarily. Front coarsely punctate, the costa widest above between the antennæ, not sulcate, but punctate throughout. Antennæ slightly flattened, nearly twice as long in the male as in the female. Pronotum glabrous, with the anterior lobe equal, rounded above, the posterior lobe rapidly expanding, nearly flat above, well shouldered; front edge gently advanced upon the occiput, posterior edge broadly rounded, marginate; transverse impressed lines well defined, continuous, rather sinuous, the last about the middle; median carina visible throughout (♀), or only on the posterior and on the front edge of the anterior lobe. Tegmina long and narrow, the apex rounded, reaching beyond the tip of the abdomen in both sexes; the costal margin considerably dilated in the male, forming the stridulating organ, or rather the "sound board," as in the genus *Gomphocerus*. Posterior femora long and slender; the tibiæ as long as the femora, the spines slender and more numerous than usual. Metasternum furnished with two converging keels which terminate near the center at the front edge and are united by a strong crosspiece. Prosternum armed with a short, blunt, quadrangular process. Terminal segment of the male abdomen elongate, wedge-shaped; supra-anal plate elongate cordate, roundly scooped out, the sides bent down so as to clasp the underlying processes. Cerci a little more than twice as long as broad, tapering, blunt.

General color light transparent green, with a metallic luster. Lateral foveolæ and fastigium of the vertex black, changing to plain brown above; occiput with a rapidly widening median brown band; median carina of the pronotum furnished with a similar band commencing in front with the carina alone, but spreading evenly posteriorly until covering the entire upper surface just before reaching the posterior extremity, where it changes to a bright rust brown. There is also a large patch of this color down the sides of the pronotum in advance of the last transverse impressed line, and another on the sides of the head back of each eye. Tegmina furnished with a row of rather large fuscous blotches along the posterior edge, also a few smaller ones along the disk which vary in size and number in different individuals; wings dull transparent green, with the principal veins and the cells on the outer third of the posterior field fuliginous; anterior or humeral field, with the veins greenish and the cells clear. Sides of meso- and metathorax brown, inclining to black. Posterior femora with four broad fuscous bands, apex ferruginous; tibiæ furnished with a narrow basal annulus of black, followed by a very broad one of greenish yellow; below this they are dull red, more or less infuscated at the apex and in the middle, brightest in the male. Anterior and middle femora brown, banded in the middle with greenish. The most striking feature in the coloration of this insect, and one which readily distinguishes it from all other North American locusts with which I am acquainted, is a series of pearly or bright silvery markings situated as follows: A rather wide line commencing just below the lateral angle and following down the front edge and around the corner to the middle of the lower edge of the pronotum; a large blotch upon the side just above the insertion of the middle pair of legs, a third just below the base of the wings, and a fourth on the trochanter of the posterior legs. There is also a very conspicuous one along each of the two metasternal carinæ mentioned above; besides these, each of the middle and posterior femora has a rather conspicuous blotch of this color on the middle of its outer face. Immersion in alcohol does not erase these. Antennæ and tarsi ferruginous; tibial spines tipped with black. Eyes alternately lined with perpendicular lines of yellow and brown.

Length of body, ♂, 19^{mm}, ♀, 23.5^{mm}; of antennæ, ♂, 7.75^{mm}, ♀, 4^{mm}; of pronotum, ♂, 3.92^{mm}, ♀, 4.5^{mm}; of tegmina, ♂, 18^{mm}, ♀, 19^{mm}; of hind femora, ♂, 11.75^{mm}, ♀, 12.35^{mm}; of hind tibiæ, ♂, 11^{mm}, ♀, 12^{mm}.

HAB.—Arizona and El Paso, Texas, (G. W. Dunn); Lerdo and Comancho, in the State of Durango, Mexico, during the month of November (Bruner).

Described from numerous specimens of both sexes.

This peculiar and gaudily colored locust is entirely "arboreal" in its habits, and lives upon a peculiar evergreen shrub (*Ceanothus*) among the small smooth oval leaves of which it readily conceals itself. During the middle of the day when the sun shines hot it is very active, and by jumping and flying from bush to bush easily eludes the pursuer. When the sky is overcast with clouds and during early morning it is very sluggish and can readily be taken. Its presence is easily detected by the sharp stridulating sound produced by the males, which closely resembles that produced by some of the Stenobothri and allies. Although of medium size, so closely does its color resemble the plants upon which it lives that it is difficult to find, even though you are aware of its presence upon a particular plant that is quite isolated.

Pedioscertetes pulchella sp. nov. [Pl. I, Fig. 10.]

Olivaceous, variegated with pinkish-yellow streaks and mottlings. The middle two-fifths of the wings crossed by a fuliginous band. Exceedingly hirsute.

Occiput moderately long, ascending rapidly to the fastigium of the vertex, which is acute; vertex between the eyes a trifle broader than the shortest diameter of the pyriform eyes, convex; frontal costa very narrow and prominent above the base of the antennæ, where it suddenly diminishes in height, sulcate throughout, the lateral walls gently and evenly diverging, continuous to the clypeus. Antennæ somewhat flattened, rather heavy, considerably longer than the head and pronotum combined. Pronotum short, the posterior lobe greatly divergent; anterior lobes nearly equal, rounded above; transverse impressed lines rather faint, the posterior one about the middle; median carina distinct throughout; lateral carinæ present only on posterior lobe as sharp shoulders; anterior margin rounded, ascending upon the occiput; posterior margin also rounded, marginate. Legs slender, somewhat heaviest in the female; posterior femora a little surpassing (♂) or not quite reaching the tip of the abdomen (♀); posterior tibiæ as long as the femora, gently bowed downward, the spines minute, slender. Tegmina of moderate width, broadest in middle, the anterior edge somewhat arcuate, posterior edge nearly straight; wings rather narrow, the cross-veins unusually faint and distant. Last ventral segment of male abdomen acuminate; the preceding segment furnished beneath with a cordate depression, which is margined by sharp carinæ that meet and continue as a median ridge to the apex of last segment. Valves of the ovipositor rather large and exserted.

General color olive green, the male somewhat brightest, streaked and mottled with dull pinkish-yellow. The entire insect covered to a greater or less degree with a whitish powder, which, together with the hair-covered surface, gives it a sort of hoary appearance. The pinkish lines are arranged as follows: On the back of the head, one on each side; another from the lower edge of the eyes obliquely backwards to the back margin of the cheek, where it continues as a border to the lower corners, the carinæ of the face, and borders of the clypeus and labium; on the pronotum as an entire border, on each side of the disk in place of the lateral carinæ, and a short backward projection from the middle of front edge of sides to first transverse impressed line; on the tegmina along the two principal veins, the front and back margins with others joining these, thereby giving the wing the appearance of being heavily and irregularly marked with dark olivaceous blotches. Posterior femora with three oblique lines each of the olivaceous and pinkish yellow; posterior tibiæ, with the under surface and anterior and middle legs testaceous; the former with the base and middle somewhat infuscated, giving them an obscure banded appearance; spines without dark tips. Wings with the basal fourth (♀) or fifth (♂) tinged very slightly with dull yellow, the apical fourth hyaline with the principal veins and some of the cross veins black; remaining portion of the wing fuliginous, a rather broad shoot extending nearly to the base along the costal margin. Antennæ ferruginous.

Length of body, ♂, 19^{mm}, ♀, 27^{mm}; of antennæ, ♂, 11^{mm}, ♀, 12^{mm}; of pronotum, ♂; 3.40^{mm}, ♀, 4.85^{mm}; of tegmina, ♂, 18^{mm}, ♀, 22.50^{mm}; of posterior femora, ♂, 10.5^{mm}, ♀, 13^{mm}; of tibiæ, ♂, 10.5^{mm}, ♀, 13^{mm}.

HAB.—Birch Creek, Idaho (Bruner).

A single pair taken in August, 1883, upon the small thorny plant known as *Grayia polygaloides*. Other specimens might have been secured had there not been a heavy frost the preceding night, thereby causing most of the locusts to seek shelter for the time being. The only time we could spare here for collecting was early morning before the heat of the day.

This species differs considerably from the description and figures of *P. nevadensis* Thos., in its variegated color, the much shorter pronotum which is rounded instead of truncate in front, and in the rounded anterior edges of the tegmina.

Subfamily ŒDIPODINÆ.

Psoloessa Buddiana sp. nov. [Pl. I, Fig. 6.]

In size and general structure very similar to *P. ferruginea* Scudd., but differing from that species in the coloration, which here is very decided.

Vertex rather deeply sulcate in the form of a new moon, without indications of a median carina; the lateral carinæ quite prominent; frontal costa plain above, gently sulcate just below the ocellus; lateral facial carinæ arcuate, united at their upper and lower ends by cross carinæ with those of the frontal costa, forming elongate walled fields, as it were, in the center of each of which is a lunate depression directly opposite to the lower edge of the ocellus. Pronotum with its lateral carinæ arcuate, the median carina prominent throughout, straight. Tegmina narrow, a little surpassing the tip of the abdomen. Posterior femora a little stouter than in *ferruginea*, reaching just past the abdomen.

Face, sides of pronotum, under side, and abdomen yellowish white; the former with a few brown dots along the costa and carinæ. Upper side of pronotum, occiput, and anterior half of tegmina testaceous, the atter with a few dots along the overlapping edges. Posterior femoral testaceous, with the usual markings of brown, though less conspicuous than common. The characteristic marking is, however, a dark-brown band commencing at the eyes and extending back to the sides of the pronotum, the upper edge of which it covers and continues across the sides of the meso and meta thorax to the tegmina, the lower or anterior halves of which it follows almost to their tips. On the pronotum this band is broadly deflected near both edges, sending down an anterior and posterior shoot nearly to the lower edge. Above, this dark band is edged with a narrow one of bright yellow.

Length of body, ♀, 20^{mm}; of antennæ, 6^{mm}; of pronotum, 4.1^{mm}; of tegmina, 17.5^{mm}; of hind femora, 13^{mm}.

HAB.—Southwestern Texas, Carrizo Springs (A. Wadgymar).

Named for my friend H. S. Budd, of El Paso, Tex., from two female specimens.

Psoloessa ? eurotiæ sp. nov.

A beautiful species that resembles the highly colored *Mestobregma pulchella* Bruner in its general color and markings. In structure and size very similar to *P. coloradensis* Thos.

Head rather small; the vertex depressed, of moderate width, the sulcus quite deep with the bounding walls sharp and arcuate, the median carinæ slight; lateral foveolæ large, subquadrate (♀) or triangular (♂). Face gently arcuate, the frontal costa moderately broad, evenly expanding and shallowly sulcate throughout. Pronotum short, the lateral carinæ greatly bowed, the last transverse impressed line cutting all three carinæ a little in advance of the middle; posterior margin very obtuse-angled. Tegmina slightly surpassing (♂) or not quite reaching (♀) the tip of the abdomen. Posterior femora moderately heavy, not quite reaching the tips of the tegmina. Antennæ rather heavy, joints 4–5 about equal, a little shorter than the others.

General color creamy white with a greenish tinge, conspicuously marked with very dark brown and black spots and bands. On the head the mouth parts, antennal sulci, a narrow circle around each eye, and a band directed backwards from the middle of the eyes black; on the pronotum a band of medium width along the upper lateral edges which cross over to the disk back of the sulcus, also the lower anterior fourth of the same color; on the thorax all but a narrow white stripe reaching from near the base of the wings to the base of the posterior femora black. Tegmina with a median line of elongate blackish spots and the two edges and apical half infuscated. Posterior femora marked above with three spots and the apex black, the middle spot the largest and continued over to the inner and outer faces. There is also a slight basal blotch and a few smaller dots of the same color along the lower edge of the outer face. Posterior tibiæ pale yellowish-red more or less infuscated; spines with their outer half black. Antennæ brunneus inclining to fuliginous.

Length of body, ♂, 12^{mm}, ♀, 18^{mm}; of antennæ, ♂, 6.2^{mm}, ♀, 4.5^{mm}; of pronotum, ♂, 2.15^{mm}, ♀, 2.85^{mm}; of tegmina, ♂, 11^{mm}, ♀, 13.25^{mm}; of hind femora, ♂, 8^{mm}, ♀, 9.5^{mm}.

HAB.—Laramie River, just inside of the Colorado line during early July, at an elevation of about 8,000 feet above sea-level (Bruner).

This is one of the few of our North American locusts that is known to have a particular food-plant. In this instance the plant is *Eurotia lanata* or the sweet sage of the West, which is also known as "winter fat" and several other local popular names. It certainly is an interesting fact to know that *Mestobregma pulchella*, a species found in quite a different region, that is also partial to the same food-plant is likewise similarly marked—showing the tendency of mimicry in color between an insect and its surroundings.

Arphia Saussureana sp. nov.

Small and rather slender; with the wings bright vermillion, which with the general appearance at the first glance reminds one of a diminutive *A. tenebrosa* Scudd.

Vertex between the eyes broad, the sulcus broadly pyriform and furnished with a strong median longitudinal carina which is severed in the middle by a deep transverse arcuate depression; bounding walls rather prominent; occiput rugulose, with two quite large semi-triangular depressions, one on either side of a slight median carina; frontal costa broad, a trifle expanding at the ocellus, very coarsely granulated and punctate throughout, slightly sulcate in the male with a heavy median carina reaching from the fastigium to the ocellus; antennæ rather heavy, a third longer in the male than the female. Disk of the pronotum tuberculate, the median carina subcristate, notched about the middle by the last transverse impressed line; posterior angle nearly square. Tegmina of medium width, reaching (♀) or extending nearly one-third of their length beyond the tip of the abdomen (♂).

General color dull brown, heavily mottled with dark brown and dull black. Wings bright vermillion or roseate, with the outer third and a rather broad tapering ulnar ray reaching nearly to the base dark fuliginous. Posterior femora obscurely faciate with fuscous; the tibiæ with a wide basal annulus of dull testaceous, remainder more or less infuscated.

Length of body, ♂, 15.75^{mm}, ♀, 21^{mm}; of antennæ, ♂, 6^{mm}, ♀, 4.25^{mm}; of pronotum, ♂, 3.50^{mm}, ♀, 4.5^{mm}; of tegmina, ♂, 16^{mm}, ♀, 18^{mm}; of hind femora, ♂, 10^{mm}, ♀, 11^{mm}; of hind tibiæ, ♂, 9^{mm}, ♀, 10^{mm}.

A large series of both sexes.

HAB.—On the hills lying back of San Francisco, Cal., during the latter part of October (Bruner, Koebele).

Aulocara Scudderi sp. nov.

About the size of *A. decens* Scudd., from which it differs in its more robust form and in having the posterior tibiæ red instead of blue.

Vertex between the eyes rather broad, the fastigium either right-angled (♂) or slightly obtuse (♀), not so deeply sulcate as in *Elliottii* and *decens;* lateral foveolæ rather large and prominent, a little elongate, the upper and lower edges parallel, the latter not quite horizontal; frontal costa continuous to the clypeus, but gently sulcate in the male, scarcely depressed at the ocellus in the female. Eyes rather large, not prominent, rounded behind, nearly straight in front. Pronotum as in the other species, except that here the median carina is but once severed by the transverse sulci. Tegmina and wings about as long (♀) or a trifle surpassing the tip of the abdomen (♂). Posterior femora stout, just reaching the tip of the body in the female but surpassing it in the male. Posterior tibiæ with the second inner terminal claw long and strong, much as in the genus Scyllina.

General color dull brown, in some specimens inclining to ferruginous, the tegmina usually very heavily and evenly mottled with dark brown quadrate spots, sometimes only confined to the disk. Some specimens have a light testaceous band reaching from the vertex backwards across the middle of the occiput and pronotum to the tips of the tegmina. Posterior femora marked as in the other species, but plainer; hind tibiæ bright coral red with a whitish basal annulus, the knee deep black; antennæ ferruginous, testaceous or lavender—usually the latter in living specimens. Lower surface dirty yellowish-white.

Length of body, ♂, 14.5^{mm}, ♀, 20^{mm}; of antennæ, ♂, 10^{mm}, ♀, 7^{mm}; of pronotum, ♂, 3.1^{mm}, ♀, 3.45^{mm}; of tegmina, ♂, 11^{mm}, ♀, 12–14^{mm}; of hind femora, ♂, 10.5^{mm}, ♀, 11.65^{mm}.

HAB.—Nebraska, Dakota, Colorado, Wyoming, Montana, British America in Saskatchewan Valley (Bruner); Kansas (F. W. Cragin).

This is a very common species throughout the region west of the Mississippi River.

Mestobregma pulchella sp. nov.

A beautiful greenish-white species marked with black and gray; wings hyaline, without a band as in *M. kiowa.* Distinct from all other North American species in habits and appearance.

In general form and size most closely related to *M. kiowa*, but differing from that species in its somewhat smaller size, the proportionately broader lower face, the smaller eyes, and generally smoother surface of head and pronotum.

The general color is a beautiful greenish white, in imitation of the plant upon which it feeds; heavily marked with the characteristic markings belonging to genus, which in the present instance are black and quite sharply defined. These latter are arranged as follows: A narrow transverse line connecting the upper extremities of the eyes, another but broader extending from the edges of the frontal costa immediately below the base of the antennæ backward across the lower half of the eyes upon the sides of the pronotum to the first transverse impressed line;

on the pronotum nearly the entire sides of the anterior lobes, also the front half of the disk along both sides of the median carina; on the meso- and metathorax the entire pleuræ except two short narrow anteriorly directed oblique blotches of the light color. The tegmina have the dorsal or posterior half free from marks, save at the immediate base, where they have the narrow converging fuscous dashes; on the lower half are three rather large black blotches, the first with its outer margin defining the basal fourth, the second about the middle, and the third just beyond; apex and base also containing a few small scattered quadrate spots; apical third more or less hyaline, the principal veins black. Wings hyaline, with the faintest possible yellowish tinge at the immediate base; veins on the outer third and along the costal margin more or less dusky. Antennæ piceous, becoming greenish white, in some specimens obscurely annulate. Posterior femora with three deep black patches above, which continue over to the inner face; lower outer carina furnished with a few dusky dots, outer face somewhat clouded. There is also an obscure clouded or marbled appearance noticeable throughout the greater portion of the greenish upper surface. Posterior tibiæ glaucous, the apex and a narrow band just beyond the base infuscated, the spines black; anterior and middle legs quite regularly annulate with dark brown or black. Sides of abdomen marked with a row of dusky dots, which are plainest in the male.

Length of body, ♂, 18^{mm}, ♀, 23^{mm}; of antennæ ♂, 9^{mm}, ♀, 8^{mm}; of pronotum, ♂, 3.62^{mm}, ♀, 4.75^{mm}; of tegmina, ♂, 18^{mm}, ♀, 21; of posterior femora, ♂, 11^{mm}, ♀, 12.3; of tibiæ, ♂, 9^{mm}, ♀, 10.85^{mm}.

HAB.—Yellowstone Valley, Montana, between Livingston and Gardiner; also at Glendive, below the mouth of Powder River (L. Bruner).

This interesting species has been observed to feed upon the foliage of the "Sweet Sage" (*Eurotia lanata*) to the exclusion of all other plants; and although so far as at present known, is local in its distribution, yet not at all rare. Why it should be confined to the valley of the Yellowstone is not known, for certainly the same plant occurs at other localities in far greater quantities. In Colorado, on the Laramie River, there is another locust found with a similar habit, which also very singularly possesses almost identical markings, although belonging to a different genus. This latter species is also new and described here for the first time.

The preparatory stages of *pulchella*, like the mature insect, are so characteristically marked and so closely resemble the perfect specimens that there can be no mistaking their identity. These also feed upon the same plant.

Conozoa texana sp. nov.

About the size of *C. sulcifrons* and *C. albolineata*, to the latter of which it is most nearly related, but differing from it in general coloration, in the shorter and more robust hind femora, in the shorter anterior lobes of the pronotum, and in the larger more globular eyes.

Vertex deeply and roundly sulcate, the bounding walls continuous with those of the frontal costa, the fastigium furnished with a rather deep V-shaped depression, from the apex of which a median carina extends backwards through the sulcus and across the occiput; lateral foveolæ rather large and shallow; frontal costa quite prominent, widening below. The sides a little contracted just below the ocellus, deeply sulcate throughout. Pronotum rather smooth. The anterior lobes combined about one-half as long as the posterior lobe; median carina twice notched, nearly equal throughout; posterior extremity about a right angle; lower lateral tooth less elongate than in *C. albolineata.* Tegmina long and narrow, reaching about one-fourth their length beyond the tip of the abdomen. Posterior femora rather robust, with the carinæ inconspicuous.

General color cinereo-testaceous, profusely and heavily mottled with dark brown and black. Antennæ black, annulate with testaceous. Tegmina testaceous on lower or anterior half, dirty white above, very heavily and profusely mottled with black. These spots not congregating in bands. Wings sulphur-yellow on basal half, crossed by a broad, arcuate, black band that sends a wide ray half way to the base near the anterior edge; apical third hyaline, with two pretty well defined longitudinal black rays reaching from the extreme tip nearly to the outer edge of the band, most apparent in male specimens. Posterior femora light testaceous, with two dark patches above and an outer face, also some dots of same color along the carinæ; posterior tibiæ pale coral red with a wide white basal annulus.

Length of body, ♂, 22^{mm}, ♀, 26^{mm}; of antennæ, ♂, 11.5^{mm}, ♀ 11^{mm}; of pronotum, ♂, 4.3^{mm}, ♀, 5^{mm}; of tegmina, ♂, 23.5^{mm}, ♀, 28^{mm}; of hind femora, ♂, 11.85^{mm}, ♀, 13^{mm}.

HAB.—El Paso, Tex. (G. W. Dunn).

Conozoa albolineata sp. nov.

Rather slenderer than the other species of the genus. Grayish-brown streaked with white.

Vertex somewhat elevated; fastigium as in *C. sulcifrons*, continuous with the deeply sulcate frontal costa, which expands evenly and gradually to the clypeus; eyes of medium size, slightly prominent, separated above by about their width; antennæ as long as the posterior femora; pronotum quite smooth in comparison with that of *C. sulcifrons* and *C. wallula*, considerably depressed at last transverse sulcus, from which point it expands and ascends quite rapidly posteriorly; median carina not prominent but visible throughout, twice notched, anterior portion most elevated, lateral carniæ slight, only noticeable on the posterior lobe, posterior angle a little less than a right-angle. Tegmina extending about one-fourth their length beyond the tip of the abdomen, slender.

General color grayish-brown above streaked with white, yellowish beneath. Head white, slightly tinged with ferruginous on the sides and front, somewhat obscured with the general color on the occiput; lateral carinæ of the fastigium more or less marked with black; antennæ reddish-brown, the basal joint whitish. Pronotum with a rather broad white stripe extending along the outer edges of the dorsum, a quadrate spot of the same color on the front edge opposite the lower angle of each eye and another in the middle of the sides; there is also a narrow border of white about the lower anterior angles. A white streak also extends oliquely backward from the base of the tegmina to the insertion of the posterior femora, also one from the middle of the back edges of the lateral lobes of the pronotum to that of the middle legs. Tegmina with the costal edge streaked with white three-fifths of their length; central field clouded with brown, not forming definite bands; nerves of apical portion dusky. Wings dull lemon-yellow at the base, crossed about the middle by a light fuliginous band of medium width, which is parallel to the body when spread; nerves of apical portion, which is vitreous, dusky. Posterior femora whitish, with the apex and two very oblique bands black externally and two ordinary ones internally; posterior tibiæ yellow with black-tipped spines, the extreme base also black. Abdomen citron yellow at base, becoming paler apically.

Length of body, 23^{mm}; of antennæ, 12.5^{mm}; of pronotum, 3.32^{mm}; of tegmina, 22^{mm}; of posterior femora, 13^{mm}; of posterior tibiæ, 12^{mm}.

Described from a single ♂.

HAB.—Los Angeles, Cal. (D. W. Coquillett).

Conozoa Koebelei sp. nov.

A little smaller than *C. wallula* Scudd. Light gray, marked with dirty white and brown. Hind tibiæ deep blue with a black base and quite wide sub-basal light-colored annulus.

Vertex between the prominent, nearly globular eyes a little wider than in *C. wallula,* deeply and broadly sulcate, the lateral walls gently diverging anteriorly to the middle and then converging to nearly one-half of the greatest width at the fastigium; frontal costa moderately broad, somewhat constricted above the antennæ, where it is plain, gently widening, and sulcate below. Pronotum smooth above; the median carina slight, twice notched, the anterior portion the highest; posterior extremity nearly a right-angle; lower lateral angles more rounded than in *wallula.* Tegmina extending past the tip of the abdomen about one-fourth their length. Posterior femora a little heavier than in *wallula,* which insect it most nearly resembles in size.

General color light cinereus with the usual markings of the genus fuscous. There are two rather broad diagonal bands of dirty white extending from the lower edge of the lateral carinæ of the pronotum in the middle forward along the side of the head, just below the eyes and meeting in the front upon the clypeus; there are also two others along the outer edges of the disk of the posterior lobe of the pronotum, and the dorsal edges of the tegmina are also of this color. Wings greenish yellow on the basal half, followed by a rather broad indistinct fuliginous band which sends the usual tapering shoot along the preanal area nearly to the base, and continues around the outer edge nearly to the anal angle. Veins and nervules of the apical half dark, also those near the edge of the anal angle. Posterior femora dimly banded; posterior tibiæ deep blue with pale basal annulus.

Length of body, ♂, 17^{mm}, ♀ $—^{mm}$; of antennæ, ♂, 9.25^{mm}, ♀, $—^{mm}$; of pronotum, ♂, 3.85^{mm}, ♀ $—^{mm}$; of tegmina, ♂, 17^{mm}, ♀, $—^{mm}$; of hind femora, ♂, 10^{mm}, ♀, $—^{mm}$; of hind tibiæ, ♂, 9^{mm}, ♀, $—^{mm}$.

A single male specimen.

Hab.—Placer County, Cal., in September (Koebele).

Trimerotropis cyaneipennisn sp. nov.

Color of posterior wings very dark blue crossed by a moderately broad dark fuliginous band, as in *T. similis* Scudd.

In size and general structure this insect is very similar to *T. vinculata*, but differs from that species in the more nearly equal size of the sexes, in the slightly larger head with larger and more prominent eyes, the slightly longer and deeper sulcus of the vertex, which here has the lateral carinæ nearly parallel and quite prominent, and also the frontal costa deeply sulcate throughout. Besides these differences already mentioned there is a general resemblance in *cyaneipennis* to the various species of *Circotettix*, and especially the slenderer ones. In the mottling of the tegmina *cyaneipennis* resembles *T. cœruleipennis* Bruner, from which it is quite distinct in the structure of the vertex and anterior lobe of the pronotum, the latter being plain above in *cyaneipennis*, while in *cœruleipennis* it is greatly elevated and tuberculate. The posterior femora are also much heavier in that species than in this.

General color dark gray with a rusty tinge above in some specimens, profusely mottled and marked with fuscous. Face, cheeks, and occiput gray, profusely mottled below and above between the eyes with brown; also two diverging bands of the same color on the occiput and another backwards from the middle of each eye. Pronotum with the disk bordered on the sides by a rather wide lighter band, also a mesial ray from the front edge and a central quadrate spot of the same color on the sides. Tegmina profusely mottled with rather large quadrate brownish spots, which in most specimens are congregated into three patches—the first occupying the basal third, the second the center of the middle, and the third the outer third of the wing—most profuse on the basal and middle areas, but not forming definite bands as in most of the other species belonging to the genus. Wings very dark blue on their basal half, crossed beyond by a rather wide fuliginous band that does not continue around towards the anal angle; apical third hyaline with the veins and nerves black. Posterior femora crossed externally by three moderately broad oblique brown bands, internally with the basal half and a single band in advance of the light yellow preapical annulation black. Posterior tibiæ deep cœrulean blue with light basal annulation, spines black-tipped. Abdomen deep blue above in some specimens, inclining to greenish along the sides; dirty white to gray below. Antennæ brown, darkest at the apex, with faint annulations of a lighter brown.

Length of body, ♂, 25^{mm}, ♀, 29^{mm}; of antennæ, ♂, 11^{mm}, ♀, 10^{mm}; of pronotum, ♂, 4.5^{mm}, ♀, 5.8^{mm}; of tegmina, ♂, 25^{mm}, ♀, 28.5^{mm}; of hind femora, ♂, 12^{mm}, ♀, 13.75^{mm}; of hind tibiæ, ♂, 10^{mm}, ♀, 11.25^{mm}.

HAB.—Salt Lake Valley, Utah, near the mouth of Ogden Cañon, just at the upper shore-line of the ancient Lake Bonneville (Bruner, Dodge). Numerous specimens both male and female.

The present species differs greatly in its habits from those of *cœruleipennis* and *azurescens*, which latter are only to be met with upon almost bare alkali flats and slopes. *T. cyaneipennis*, on the other hand, frequents rather well-clothed surfaces among the rocky *talus* of mountain sides, where it is found in company with *Pycnodyctia Wheeleri*? Thos., also a blue-winged *Œdipodini.*

Trimerotropis azurescens sp. nov.

This form differs from *T. cœruleipennis* Bruner, with which it has hitherto been confounded, in the entire absence of all traces of the band on the wings, as also in the structure of the pronotum. It is also a slenderer and longer winged insect than that species.

Vertex between the eyes very broad, depressed, and quite deeply sulcate, with the median carina nearly as prominent as the bounding walls; the pit at the extreme vertex very well defined but not quite so deep as in *cœruleipennis.* Eyes not quite as prominent as in that species, and with the frontal costa not so deeply sulcate as there. Pronotum with the anterior lobe plain above, the median carina nearly equal throughout; posterior edge a little less than a right-angle. Wings a little more ample than in *cœruleipennis*, with the nerves of the outer half of the post-axillary field very irregular. Posterior femora shorter and narrower than in that species, and the antennæ a little heaver and longer than there.

General color light grayish yellow varied with brown. The tegmina usually quite evenly flecked with quadrate fuscous spots, which in some specimens have a tendency of gathering into groups as in *cœruleipennis.* Wings very delicate diaphanous cœrulean blue on the immediate basal portion from which point the color gradually fades outward, without the slightest indication in cell or vein of the usual dusky band—being the only species of the genus entirely without a trace of this character; veins and cross-veins black except at the immediate base and a small space on the axillary field towards the apex. Posterior femora dimly banded externally; internally, alternately yellow and black. Posterior tibiæ and tarsi yellow, with black spines. Anterior and middle legs mottled and banded with fuscous. Abdomen and under side dull whitish yellow or cream color. Antennæ very markedly annulate.

Length of body, ♂, 20–23^{mm}, ♀, 29–31^{mm}; of antennæ, ♂, 10.5^{mm}, ♀, 10^{mm}; of pronotum, ♂, 5^{mm}, ♂, 6^{mm}; of tegmina, ♂, 23–25^{mm}, ♀, 29-32^{mm}; of hind femora, ♂, 11^{mm}, ♀, 13^{mm}; of hind tibiæ, ♂, 9^{mm}, ♀, 11^{mm}.

HAB.—Fort Benton, Mont., U. S. National Park, Wyoming, and Lemhi or Salmon River, Idaho (Bruner); Alkali Stage Station, Green River, Wyoming (S. H. Scudder).

The present species is what might well be termed a barren ground locust from its habit of frequenting only desolate alkali flats and the dried-out beds of shallow saline lakes, where it maintains its almost solitary existence upon the few dwarfed and straggling *Chenopodiaciæ* that manage to draw a scant sustenance from the strongly impregnated soil.

Trimerotropis bifasciata sp. nov.

Having the general appearance of *T. pseudofasciata* Scudd., and probably that species as determined by Saussure [Prodrom. Œdipod, p. 172]. It differs from it, however, in several important characters.

Head rather short and broad, eyes wider apart than usual in the genus, not prominent, fastigium bounded by well defined carinæ and separated from the sulcus of the frontal costa by a Λ-shaped carina, the apex of which continues as a median carina that divides the fastigium into two longitudinal furrows that are interrupted about the center by a lateral triangular projection from the front edges of the eyes; pronotum rather short and broad, deeply cut by the last transverse sulcus, anterior lobe tuberculate, rather prominent, glossy, posterior lobe roughly granulose, median carina distinct, twice notched, lateral carinæ forming well defined shoulders to posterior lobe, posterior angle obtuse.

General color ferruginous and ochraceous.

The tegmina are rather shorter than usual and very distinctly bifasciate. The basal fourth dark chocolate brown, darkest at outer edge, and the second band a rather broad one of same color with its inner edge just about the middle of the elytra, and reaching entirely across; beyond this the remaining portion is hyaline with a few inconspicuous spots confined to the upper and lower edges, veins and cross-veins dark. Posterior femora with the apex black internally and brown externally, followed below by a rather broad yellowish-white annulation and below this by one of black, giving it the appearance of that of *Hadrottetix trifasciatus*. Posterior tibiæ with the basal third yellowish and the remainder deep plumbeous. Wings with the basal half very light greenish yellow crossed by a rather narrow, interrupted, arcuate, fuliginous band, with the inner edge about the middle; beyond this band the wing is hyaline with dusky nerves and cross-veins. Principal nerves of basal portion greenish.

Size of *T. cyaneipennis.*

HAB.—Los Angeles, Cal. (D. W. Coquillett).

This locust has something of the appearance of a species very common in the vicinity of Ogden, Utah, that I have referred to *T. citrina* Scudd., but is much heavier in its structure. It and *T. pacificus* were taken upon a sandy, rather barren soil, judging from their glossy appearance.

In addition to these there is a third species of this genus, which appears to be new. The specimens here described were received from the same gentleman.

Trimerotropis californica sp. nov.

In size and general appearance this insect comes very close to *T. cœruleipennis* Bruner, from which, however, it is quite distinct as the color of the posterior tibiæ and wings will at once indicate. It is also a somewhat slenderer species than the one named above.

Vertex between the eyes moderately broad, fastigium as in *T. cœruleipennis*, partly closed in front by the meeting of the lateral carinæ which separate it from the rather deep quadrangular pit at the upper extremity of the frontal costa. Frontal costa nearly equal to (♂) or expanding considerably (♀) below the ocellus; not very deeply sulcate. Antennæ normal, not annulate, nearly black. Pronotum with the anterior lobe somewhat elevated, though much less so than in the species above referred to, rather coarsely granulose; median carina well defined, posterior border a right angle, lower posterior lateral angles acute. Tegmina and wings moderately long and narrow, surpassing the abdomen nearly one-third of their length in the male, and about one-fourth in the female. Posterior femora nearly (♀) or quite (♂) reaching the extremity of the body, somewhat slenderer than in *T. cœruleipennis.*

General color above dirty yellowish gray profusely flecked with dull brown and black spots and dots. Tegmina with these brown spots congregated into three irregular, dim bands, situated as in *T. vinculata.* Wings yellow on the basal half, crossed in the middle by a moderately broad, dark, fuliginous band, which sends a humeral ray nearly to the base as well as along the humeral vein almost to the apex; apical portion hyaline, with the median, axillary and subaxillary veins black. Posterior femora crossed externally by three slightly oblique dusky bands, internally by the one nearest the apex; basal half and apex also black. Posterior tibiæ with the base black, followed by a moderately wide annulus of whitish yellow, below which they are a bright coral red; tarsi also red. There is also a reddish hue upon the upper side of the abdomen—most decided in the male—yellowish white beneath.

Length of body, ♂, 22^{mm}, ♀, 24^{mm}; of antennæ, ♂, 11.25^{mm}, ♀, 9^{mm}; of pronotum, ♂, 4.42^{mm}, ♀, 5^{mm}; of tegmina, ♂, 24^{mm}, ♀, 25^{mm}; of posterior femora, ♂, 11.75^{mm}, ♀, 13^{mm}; of posterior tibiæ, ♂, 11^{mm}, ♀ 12.15^{mm}.

Described from two males and a single female.

HAB.—San Louis Valley, Cal. (D. W. Coquillett).

Trimerotropis modesta sp. nov.

Pale tile color inclining to gray, with two rather narrow dusky bands upon the tegmina. Posterior tibiæ red; the wings with a wide, light, fuliginous, arcuate band just beyond the middle, the basal portion dull yellow.

Vertex of moderate width, shallowly sulcate, partly closed in front with the median carina faint; frontal costa not prominent, the sides a trifle constricted just below the ocellus, plain above, sulcate from the antennæ down. Face distantly and shallowly punctate, slightly oblique. Pronotum with the disk nearly flat, the anterior lobe much the same as in *T. thalassica;* posterior lobe coarsely granulated and furnished with a series of medium sized tubercles arranged in a similar manner with those of *T. pistrinaria* and *T. laticincta* Sauss. Tegmina as long as the body, extending about one-fourth of their length beyond the tip of the abdomen. Posterior tibiæ and femora heavy, as long as the abdomen.

General color pale rust brown inclining to gray, lightest beneath. Tegmina furnished with two narrow converging brown bands and a few scattered quadrate spots on the basal part of the apical third; wings pale yellow, crossed by a wide but not very dark fuliginous band shaped as in *T. vinculata,* save that the distal ray reaches nearly to the base of the wing in the present species. Apical portion hyaline, with the principal veins infuscated. Posterior femora with but a single dusky band outside, and two black and three yellow ones inside. Posterior tibiæ light coral red. Antennæ very dark brown on the apical third and of the color of the body on the basal portion.

Length of body, ♂, —^{mm}, ♀, 26^{mm}; of antennæ, ♂, —^{mm}, ♀, 10.5^{mm}; of pronotum, ♂, —^{mm}, ♀, 5.5^{mm}; of tegmina, ♂, —^{mm}, ♀, 26^{mm}; of hind femora, ♂, —^{mm}, ♀, 13.25^{mm}; of hind tibiæ, ♂, —^{mm}, ♀, 12^{mm}.

Described from two female specimens.

HAB.—Silver City, N. Mex. (Charles H. Marsh).

There is some resemblance between this insect and the one known as *Conozoa Behrensii* Sauss., but a comparison of the two will at once show their distinction. The main cause of their resemblance is their color, and this resemblance becomes less apparent upon a slight comparison.

Trimerotropis thalassica sp. nov.

About the size of *T. vinculata* Scudd. Varying in color from dark to griseo-testaceous, with the colored portion of the wings sea-green. Wings and tegmina but dimly banded. Posterior tibiæ deep cœrulean with basal annulus of dirty whitish.

Head, when seen from in front, as broad above as below, a little longer than common with the species of the genus; the eyes rather large and prominent, separated above by the flat (♀) or slightly sulcate (♂) vertex, which in both sexes is furnished with a faint median carina that terminates in front without perceptibly branching and uniting with the lateral carinæ; frontal costa of nearly equal width throughout, sulcate only at the ocellus. Face minutely punctate, the punctæ brown or black. Antennæ of the normal length, light testaceous, with very faint annulations of a darker color. Pronotum somewhat smoother than usual, the anterior lobe but gently raised above; the median carina rather faint and nearly equal; posterior angle slightly acute in the male, about a right angle in the female; posterior lateral edges furnished with a minute tooth-like downward projection as in *T. californica* and *T. pacifica*, the lower angle with the apex minutely rounded. Tegmina moderately narrow, the veins and cross-veins not prominent, the latter more numerous than usual on the apical third. Posterior femora normal, reaching the tip of the abdomen in both sexes; posterior tibiæ in the single female specimen examined greatly sinuous.

General color dark gray (♂ specimen) to testaceous gray (♀ specimen), evenly and minutely flecked with dusky dots, thereby giving the surface a granular appearance. Tegmina very dimly (♀) or with the bands moderately well defined, brown and arranged as in *T. vinculata* (♂). Wings deep sea-green, a little the lightest in the female, with a very faint fuliginous arcuate band just beyond the middle in the male, but in the female indicated only by the infuscation of the nerves belonging to that region; apical portion hyaline with most of the veins dark. Posterior femora black internally with a preapical yellowish annulus, externally without any bands, but furnished with an upper and lower elongate black spot in advance of the pale annulus. There is also a faint greenish tinge on the basal portion of the abdomen above.

Length of body, ♂, 20^{mm}, ♀, 26^{mm}; of antennæ, ♂, 9^{mm}, ♀, 9.35^{mm}; of pronotum, ♂, 4.4^{mm}, ♀, 5.25^{mm}; of tegmina, ♂, 21^{mm}, ♀, 26^{mm}; of hind femora, ♂, 10.5^{mm}, ♀, 13.85^{mm}; of hind tibiæ, ♂, 9^{mm}, ♀, 12.15^{mm}.

HAB.—Los Angeles, Cal., in September and October (A. Koebele).

Trimerotropis pacifica sp. nov.

Size and markings similar to those of *T. vinculata*. Pronotum quite long and smooth. Head deeper than usual in the genus.

This locust has a slight general resemblance to one form of *Hadrotettix trifasciatus* Say, and, if it were not for other characters which forbid its being placed there, I should feel inclined to refer it to that genus.

Head and thorax deeper than usual in the genus, with the carinæ and angles well defined, but otherwise appearing smooth and glossy to the naked eye. The magnifying glass, however, reveals numerous small pits or poculi that are evenly distributed throughout the face as well as the anterior lobes of the pronotum. Fastigium of the vertex flat, sloping gently forward and divided into two lateral halves by a rather prominent median carina, with the lateral edges rather blunt but plainly visible, continuous with the carinæ of the frontal costa, expanding slightly but evenly downward, fading before reaching the clypeus, deeply sulcate, deepest at the ocellus, bounding walls prominent but rounded, smooth. Ocellus and lateral ocelli very round and shining, ferruginous. Antennæ a trifle longer than usual in the genus, somewhat flattened. Pronotum deeper than usual, expanding slightly downward to the lower edges anteriorly so as to make them nearly parallel; posterior lower angles more acute than in any other species with which I am acquainted; dorsum with the median carina visible and nearly equal throughout, twice notched; the middle lobe very short, expanding rapidly posteriorly, lateral carinæ visible as rounded shoulders on the posterior lobe; posterior edge a little more than a right-angle. Tegmina and wings as in *T. vinculata*.

General color light cinereous, with a plumbeous tinge about the head and pronotum, mottled with dark brown. Head dirty bluish white, darkest above, the pits appearing as specks of dust; antennæ dark ferruginous, annulated with ochraceous, eyes ferruginous; pronotum cinereous with a central quadrate whitish spot upon the lateral lobes, posterior margin marked with a series of dark brown spots. Tegmina marked with dark brown, much as in *T. vinculata*, save the middle band, which here only reaches two-thirds across the wing, and if anything the apex is less mottled than in that species; wings with the base very light yellow, crossed by a rather narrow fuliginous band, which is divided into two parts by the yellow humeral veins; humeral portion extending nearly to the base of the wing, the portion beyond the dusky band hyaline with the nerves whitish except at the extreme tip, where they are fuliginous. Posterior femora as in *T. vinculata*, posterior tibiæ yellowish with black-tipped spines.

Length of body, 23^{mm}; of antennæ, 14^{mm}; of pronotum, 6^{mm}; of tegmina, 25^{mm}; of posterior femora, 9^{mm}; of posterior tibiæ, 8^{mm}.

Described from a single male.

HAB.—Los Angeles, Cal. (D. W. Coquillett).

Trimerotropis perplexa sp. nov.

A peculiarly perplexing form belonging to the group of non-banded winged species and resembling to a certain extent the *Tr. azurescens* of the extreme west and northwest, but from which it is to be distinguished by its more robust form, shorter and broader tegmina and wings, and in the much heavier posterior femora.

Vertex between the large moderately prominent eyes, broad, smooth and quite deeply sulcate, with well defined lateral and longitudinal median carinæ, the latter branching at the apex of the fastigial depression and uniting with the lateral in front and continuing posteriorly upon the occiput almost to the front edge of the pronotum; frontal costa moderately broad, with well defined edges, quite deeply (♂) or more shallowly (♀) sulcate, not continuous with the sulcus of vertex. Pronotum nearly as broad as long, the surface finely rugose, the disk nearly flat, the anterior lobes quite smooth and but gently raised above; the median carina nearly equal and quite plain throughout;

lateral lobes with the anterior and posterior edges almost parallel. The lower posterior angle evenly rounded; first and last transverse impressed lines continuous, the latter considerably in advance of the middle; posterior extremity more than a right-angle. Tegmina rather broad, and shorter than in the allied forms, reminding one of these members in the genus Circotettix, and especially those of *C. maculatus*, not reaching more than one-fifth of their length beyond the tip of the abdomen. Wings nearly as broad as long in some specimens. The radial or anal field full and furnished with strong radial veins, the cross-veins few and quite irregular in their arrangement. Posterior femora robust, almost reaching the extremity of the abdomen in both sexes. Abdomen a little heavier than usual in members of the genus. Body without the pruinescens or hairs usual in other species found in like localities.

General color light gray, varied and mottled with dull or plain brown; in some specimens inclining to pale fawn or testaceous. Tegmina more or less densely mottled with pale brown quadrate spots that show a tendency to congregate into three patches, the one occupying the basal third, the second the middle, and the third the outer third of the wing; remainder of wing light gray. Wings without any indication of transverse dusky band, the basal portion very pale dull yellow, inclining to greenish when seen as folded. The veins and cross-veins of apical half (save near the anterior edge where they are white) dusky. Posterior femora with the usual dusky markings outside, and with inner face and lower sulcus chiefly black; the posterior tibiæ pale greenish yellow with black spines. Antennæ faintly annulate.

Length of body, ♂, 25^{mm}, ♀, 30^{mm}; of antennæ, ♂, 12^{mm}, ♀, 11^{mm}; of pronotum, ♂, 4.85^{mm}, ♀, 6.75^{mm}; of tegmina, ♂, 23^{mm}, ♀, 28^{mm}; of hind femora, ♂, 11.5^{mm}, ♀, 14.15^{mm}.

Described from 4 male and 7 female specimens.

HAB.—Bad Lands, about five or six miles to the north of Chadron, Nebr., during the month of August (L. Bruner).

This peculiar locust, like all of the allied forms, is partial to nearly bare surfaces, and especially to such as have the soil more or less strongly impregnated with alkalies. It is a noisy insect and produces a very decided clatter when upon the wing, showing that it is not distantly removed from the various members of the genus *Circotettix*, as many of its structural characters would also indicate.

Cirootettix lapidicolus sp. nov.

Dark grayish brown, profusely mottled with dull black. Wings bottle-green without a well-defined dusky band; nerves and cross-veins of apical half more or less infuscated. Posterior tibiæ glaucous with light basal annulus.

Head of moderate size, the eyes quite prominent, giving the upper portion a square appearance. Vertex between the eyes of moderate width, somewhat narrower, with the sulcus of the fastigium also a trifle deeper than in *C. undulatus*, the bounding walls sharper and better defined than there and continuous with the lateral carinæ of the frontal costa. The latter and also the lateral facial carinæ much more prominent than in *undulatus*. It also differs from that species in its smoother body, more graceful and slenderer form, its longer and broader wings, and shorter antennæ, which are very slender and thread-like. The chief and distinguishing characteristic of this species, however, is in the venation of the hind wings. Instead of there being but a single vein along the middle of the axillary field there are two of nearly equal prominence; the secondary or auxiliary vein being a branch of the first radial which in the female unites with the primary vein several millimeters before reaching the outer margin, but in the male continues parallel withor a little divergent from it to the edge. The radial veins here are no heavier in the male than in the female, and the cross-veins of the humeral area are irregular, while in *undulatus* they are very regularly scalariform. There are also other slight differences in the venation of the wings between the two species, as there is also in the margin. In*l apidicolus* the margin is even more undulate or lobed than in *undulatus*.

General color dark-brownish cinereous, very profusely mottled with rather small quadrate fuliginous spots, giving the insect a dingy black color in imitation of the rocks among which they were taken. Wings bright bottle-green or greenish yellow with a very faint indication of the usual fuliginous band on the humeral field in some specimens, wanting in others; apical portion with the veins and cross-veins black. Posterior tibiæ glaucous, furnished with a moderately broad, light, testaceous, basal annulus; tibial spines black; tarsi testaceous. Antennæ dimly annulate.

Length of body, ♂, 30$^{\mathrm{mm}}$, ♀, 31$^{\mathrm{mm}}$; of antennæ, ♂, 9.5$^{\mathrm{mm}}$, ♀, 9$^{\mathrm{mm}}$; of pronotum, ♂, 6.3$^{\mathrm{mm}}$, ♀, 6.5$^{\mathrm{mm}}$; of tegmina, ♂, 32$^{\mathrm{mm}}$, ♀, 30.5$^{\mathrm{mm}}$; width of wing, ♂, 21$^{\mathrm{mm}}$, ♀, 18.5$^{\mathrm{mm}}$; length of posterior femora, ♂ and ♀, 14.5$^{\mathrm{mm}}$; of tibiæ, ♂ and ♀, 12$^{\mathrm{mm}}$.

HAB.—Salmon City, Idaho (Bruner).

This locust was observed at but a single locality in the Salmon River range of mountains, west of Salmon City. It occurred among the fine rocks forming the talus at the foot of a high precipice facing the south. Although local, it is quite common, and was found in company with several other locusts, such as *Arphia tenebrosa*, *Circotettix verruculatus*, etc. In habits it is very similar to those of its allies, and during the hottest, brightest hours of noonday is to be seen and heard in the air, producing its clattering music, which is anything but soothing.

Circotettix shastanus sp. nov.

A moderately slender species about the size of or a little larger than *C. verruculatus* Kirby, but more closely related to *C. undulatus* Thos. Wings with the disk yellow, brightest near the posterior outer edge.

Structure and markings of head, pronotum, and tegmina as in *C. lapidicolus* Bruner, but differing from that species in the venation and coloring of the wings. There is but a single axillary vein present in the male of this species, while in *verruculatus* and *lapidicolus* there are two; *undulatus* also has the secondary vein present, although much obliterated. Besides this difference in the axillary field there is also a difference in the venation of the radial field—the present species having the cells of the outer edge very regular, short and wide, and the radial veins very strong. Posterior tibiæ glaucous, the spines black. Apical portion of the wing hyaline, with dark veins and cross-veins preceded by a slight indication of a fuliginous band.

Length of body, ♂, 25^{mm}, ♀, $—^{mm}$; of antennæ, ♂, 8^{mm}, ♀, $—^{mm}$; of pronotum, ♂, 5.5^{mm}, ♀, $—^{mm}$; of tegmina, ♂, 28^{mm}, ♀, $—^{mm}$; of hind femora, ♂, 12^{mm}, ♀, $—^{mm}$; greatest breadth of wing, ♂, 17^{mm}, ♀, $—^{mm}$.

Described from a single male specimen.

HAB.—Hazel Creek, Shasta County, Cal., in the month of August (Jas. Behrens).

Œdipoda (?) occidentalis sp. nov. [Pl. I, Fig. 7.]

Resembling rather distantly the various members of the genus *Circotettix*, but with much shorter tegmina and wings. Dirty grayish brown, the mottlings on the tegmina gathered into obscure bands. Wings light greenish yellow, without the usual fuliginous band in most specimens, apical half hyaline with the nerves and cross-veins dark.

Head short and broad, widening but gently below, the face straight, perpendicular. Antennæ of medium length, a little heavy, with the joints somewhat flattened, the apex acuminate in the male. Vertex considerably depressed, between the rather prominent, almost globular, eyes nearly (♂) or quite as broad as their shortest diameter (♀), the sulcus irregular, a little expanding in front, quite shallow, furnished with a distinct longitudinal median carina that divides in front and after joining with the lateral carinæ continues down the face as the walls of the frontal costa; frontal costa rather wide, a little constricted at the upper end and just below the ocellus, from this latter point expanding and reaching the clypeus, a rather deep Λ-shaped pit at its upper extremity, plain between the antennæ, sulcate at and below the ocellus. Face coarsely pitted and transversely wrinkled. Pronotum short and broad, rapidly widening posteriorly; anterior lobe short, rounded above, nearly equal, coarsely wrinkled transversely and severed from the front edge of the posterior lobe by the deep last transverse impressed line; posterior lobe coarsely and closely granulate, with well-defined shoulders; median carina slight, twice severed, the last only one-third the distance from the front edge; posterior extremity nearly (♀) or quite (♂) a right-angle; anterior edge slightly advanced upon the occiput; lower lateral edges rather more rounded than in the allied forms. Tegmina moderately broad, and very closely reticulated—so much so as to give the unmagnified surface a sort of granular appearance—most of the cross-veins as heavy as the veins, extending a little beyond the tip of the body in both sexes. Posterior femora ample, with heavy carinæ, considerably longer than the tibiæ, reaching the tip of the abdomen in both sexes.

General color dirty grayish brown, inclining to ferruginous in some specimens, lightest beneath. The tegmina mottled with small quadrate fuscous spots, which are gathered into groups forming two dim bands, the one with its outer edge defining the basal third, and the second across the middle of the wing; there are also a few scattered spots on the apical third; all the nerves and veins of the tegmina are brownish testaceous, darkest near the base, the wing itself being dull dirty yellow becoming more or less transparent apically. Wings light greenish yellow on the basal half, usually without any well-defined fuliginous band, but in some specimens represented by a very faint cloudiness in some of the cells just beyond the middle of the wing; veins and cross-veins of the apical half of the wing black, which on the middle of the humeral field reach nearly to the base. Posterior femora with the basal half of the inner face and lower sulcus black, the former followed by a narrow yellow then a black band; externally crossed by two faint dusky oblique bands; posterior tibiæ glaucous with a rather wide dull yellow annulus just below the knee; spines black. Antennæ dark, obscurely annulate.

Length of body, ♂, 17^{mm}, ♀, 21^{mm}; of antennæ, ♂, 7^{mm}, ♀, 6.5^{mm}; of pronotum, ♂, 3.6^{mm}, ♀, 4.5^{mm}; of tegmina, ♂, 16.5^{mm}, ♀, 19^{mm}; of hind femora, ♂, 10^{mm}, ♀, 12^{mm}; of hind tibiæ, ♂, 8.35^{mm}, ♀, 9.75^{mm}.

HAB.—On high stony hill-tops to the southwest of San Francisco, Cal., late in October (Koebele, Bruner).

Thrincus (?) avidus sp. nov. [Pl. I, Figs. 2, 3.]

Considerably larger than *Thrincus californicus* Thos., with the tegmina and wings much longer than these. Cinereo-testaceous, profusely mottled with dull rust brown and black.

Head proportionately broader and longer than in *T. californicus*, and less sunken into the front edge of the pronotum than in that species. Vertex between the eyes a very little broader (♂), or nearly twice as broad (♀) as the diameter of the basal antennal joint, depressed, roundly sulcate, rather shallowly in the female but deeper in the male, the lateral carinæ parallel, reaching from near the posterior edge of the eyes deflecting and meeting in front in a right angle; frontal costa rather narrow above, expanding below and fading just before reaching the clypeus, gently sulcate throughout in both sexes. Face, sides of head and thorax coarsely pitted and wrinkled, giving the surface a very rough appearance. Pronotum short and broad, the anterior lobe with the sides nearly parallel, rounded above; posterior lobe rapidly expanding, the disk nearly flat, coarsely granulate; median carina almost obsolete; posterior edge forming a rather obtuse angle with the apex cut off. Tegmina and wings extending about one-third (♂) or only one-fifth of their length beyond the tip of the abdomen (♀). Posterior femora rather heavy, just reaching ♀, or slightly surpassing the tip of the abdomen ♂; posterior tibiæ with the spines few, long, and stout.

General color cinereo-testaceous, profusely mottled with dull rust brown and black, darkest above. The face and sides of pronotum and body thinly covered by a whitish, mealy powder or pruinescens. Tegmina irregularly mottled with numerous quadrate brown spots which arrange themselves in rows along the dorsal edges; wings pellucid on the basal third, beyond this hyaline inclining to pale fuliginous apically, the veins and cross-veins of the outer two-thirds for the most part dusky. Posterior femora marked externally in the middle with a faint and preapically with a nearly black fascia; tibiæ inclining to light blue-gray along the bases of the spines which latter are black tipped; anterior and middle legs mottled, the mottlings congregating into obscure bands. Antennæ testaceous, a little infuscated apically, in some specimens annulate.

Length of body, ♂, 15^{mm}, ♀, 27^{mm}; of antennæ, ♂, 6^{mm}, ♀, 8.2^{mm}; of pronotum, ♂, 3^{mm}, ♀, 5.15^{mm}; of tegmina, ♂, 17^{mm}, ♀, 25^{mm}; of hind femora, ♂, 9^{mm}, ♀, 14.5^{mm}; of hind tibiæ, ♂, 8.1^{mm}, ♀, 12^{mm}; greatest width of thorax, ♂, 4.85^{mm}, ♀, 8^{mm}.

HAB.—Arid slopes back of Albuquerque, N. Mex., in May (H. Bruner).

Thrincus (?) maculatus sp. nov.

The female quite large and robust; grayish, heavily mottled with dark brown or dull black; posterior femora with lower sulcus on inner face deep purple-red; tibiæ with inner edge also of same color.

Vertex between the eyes moderately wide, shallowly sulcate, with a rather prominent median longitudinal carina that extends from the apex across occiput to front edge of pronotum; there is also a more or less distinct transverse ridge just about the middle that divides the sulcus into four nearly equal subquadrate fields, the two posterior ones with their surface smooth and well defined, the anterior two, rough and dim in outline; lateral fovealæ obsolete, and their place occupied by a raised triangular field, in the center of which are situated the large lateral ocelli; frontal costa quite broad above, a little contracted just above the antennæ, and terminating immediately below the ocellus, at which it is a trifle depressed; lateral facial carinæ tortuous, rather dim; eyes large and prominent, reniform, fully as long as that portion of the cheeks just beneath; antennæ filiform, nearly as long as the head and pronotum combined. Pronotum widening posteriorly, rugose tuberculate, the disk nearly flat; the three transverse impressed lines nearly equally plain, continuous, the last a little in advance of the middle; anterior edge nearly straight, posterior edge a little acute-angled, with the apex rounded, entire pronotum strongly marginate. Tegmina straight and moderately broad; reaching fully one-fourth their length beyond the tip of the abdomen; the veins moderately well defined, wings normal. Posterior femora, with their base not greatly inflated; the carinæ and pinnæ of outer and inner disks strong, but not prominent, extending slightly beyond the tip of the abdomen. Tibiæ strong, few-spined and somewhat hirsute; anterior and middle femora with their apices inflated beneath externally.

General color dirty grayish white, inclining to a pale testaceous in some specimens, very heavily blotched and mottled with dull black or dark brown, most heavily upon the tegmina, which in some specimens are almost entirely obscured with the darker color. Posterior femora and tibiæ with their inner face deep purplish red. Antennæ fuscous, annulate with testaceous. There is usually a more or less distinct pruinescens upon the entire upper surface of the insect, which in conjunction with its dull color would render its detection exceedingly difficult in the desert.

Length of body, ♀, 45^{mm}; of antennæ, 12^{mm}; of pronotum, 9.5–10.25^{mm}; of tegmina, 35–37^{mm}; of hind femora, 20^{mm}; greatest width of thorax, 11^{mm}.

Described from four female specimens.

HAB.—Needles, California (Wickham).

Genus **Haldemanella** Sauss.

In a recent work* Mr. Henry de Saussure establishes the genus *Haldemanella* for the reception of certain large locusts that inhabit the arid regions of Arizona and New Mexico. Of these two species have been described by American authors, viz: *Ephippigera tschivavensis* Haldemann and *Eremobia magna* Thos. In 1872, Mr. Townend Glover figured an insect under the manuscript name of *Phrynotettix verruculata* Uhler, which also belongs here [Illustr. Amer. Entom. Orthopt., Pl. VI, figs. 25, 25 side view]. This latter evidently is synonymous with Haldemann's *tschivavensis;* while Thomas' insect is distinct, as can be seen by comparing the two descriptions and figures.

I herewith add a third to these toad-like locusts of the deserts.

The genus *Haldemanella* can be characterized as follows:

Body very obese, depressed, rugose, somewhat pubescent.

Antennæ filiform, moderately long. The head not large; the face vertical, broadening a little below; the vertex between the eyes broad, declivant in front; the eyes rather large and prominent; the frontal costa quite wide and prominent above between the antennæ, fading below the ocellus. Lateral foveolæ nearly obsolete, in the female, minute in the males, where they are triangular. Lateral ocelli transparent.

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*Additamenta ad Prodromum Œdipodiorum, p. 153.

Pronotum broad and shield-like; the front lobe strongly coarctate above, the hind lobe broad and flattened and drawn out to a prolonged point behind. Tegmina and wings abbreviated; the former in the female lateral, about as broad as long, the apex broadly rounded, in the males sometimes fully two-thirds as long as the abdomen and meeting on the back. Abdomen heavy at the base but tapering rapidly backwards, not carinate. Tip of male abdomen strongly upturned, the last ventral segment small and entire. Posterior femora robust, pubescent, the upper and lower carinæ destitute of teeth; the tibiæ bowed, heavy. Entire surface with an earthy or dirt-covered appearance.

Haldemanella robusta sp. nov.

A very distinctly marked species that differs considerably from both *H. tschivavensis* and *H. magna.* White, testaceous, and fawn color. Female very large and robust; the male more graceful.

Pronotum, head and sides of thorax very rough—being ridged, pitted and "warty" in appearance, reminding one very much of the skin of our roughest toads. Vertex between the eyes very wide, equaling that of the shortest (♂) or fully equal to the longest diameter (♀) of the moderately prominent eyes; in the female plane, but broadly and ather deeply sulcate in the male; the apex greatly depressed and closed in front by a transverse carina; frontal costa very irregular, sulcate above and below the antennæ but plane between them, the sides somewhat contracted just below the fastigium and strongly pinched below the ocellus where they terminate, the costa continuing to the clypeus as a swelled ridge; antennæ rather heavily filiform, reaching only to middle of pronotal shield, 22-jointed. Pronotum very large and shield-like, the surface very coarsely and irregularly rugose and tuberculate; the anterior lobe without lateral carinæ, the middle and posterior lobes with these strongly marked; anterior edge slightly advanced in the middle; the posterior lobe greatly but broadly elongate, its edges undulate and toothed; the median carinæ perceptible only on posterior lobe; transverse sulci profound, continuous, the third in advance of the middle. Tegmina and wings abortive; the former, which are broadly rounded in the female, only reaching to front edge of second abdominal segment, in the male three-fifths as long as the abdomen, tapering; wings fully as long as the tegmina—both these and the former densely reticulate. Abdomen tapering rapidly in the female, but less so in the male, very faintly carined above; the apex of male quite strongly upturned, the last ventral segment conical; valves of the ovipositor exserted, short, strong, and unusually blunt.

Posterior femora coarse and heavy, the carinæ of the outer disk rather inconspicuous, and the pinnæ distant and few; posterior tibiæ heavy, bowed, the inner spines much the longest and heaviest, arcuate, very sparsely hirsute as is, in fact, the entire insect.

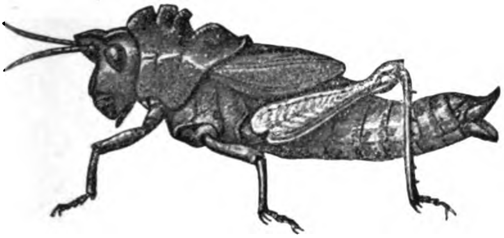
General color (dried after remaining for a short period in alcohol) dirty white below; testaceous, marked with streaks and blotches of light reddish-brown above. The brown markings are arranged somewhat as follows: Sides of frontal costa, the margin of clypeus, middle of cheeks, nearly all of occiput; on the pronotum along the line of lateral carinæ, a pair of stripes upon the disk that cross each other at first transverse sulcus, and four elongate dashes on disk of posterior lobe; also a median lateral band with a shorter one above near the posterior edge. Sides of thoracic and abdominal segments, anterior and middle femora and upper half of posterior femora also more or less mottled; all of the tibæ fasciate with brown and testaceous. Tegmina with the veins and a few mottlings of the brown, remainder testaceous. Markings of the female less conspicuous than those of the male.

Length of body, ♂ 32^{mm}, ♀ 46^{mm}; of antennæ, ♂ 11.5^{mm}, ♀ 14^{mm}; of pronotum, ♂ 16^{mm}, ♀ 22^{mm}; of tegmina, ♂ 14^{mm}, ♀ 8.5^{mm}; of hind femora, ♂ 17^{mm}, ♀ 20.5^{mm}; greatest width of pronotum, ♂ 9.75^{mm}, ♀ 15^{mm}.

Described from two males and two females.

HAB.—Collected in southern Arizona during the summer of 1887 by G. W. Dunn. Received from the curator of the museum of the California State University (Bruner).

Like the other two described North American representatives of the genus this locust is also a denizen of the deserts, for which life it is eminently fitted, both as to structure and coloration.



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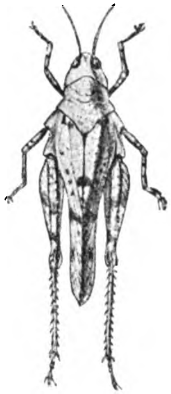

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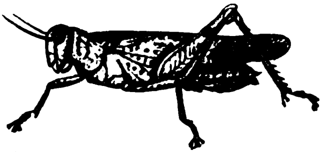

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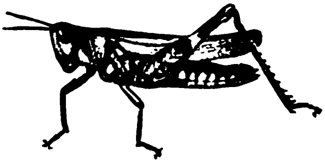

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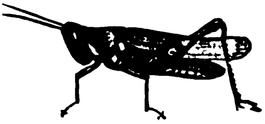

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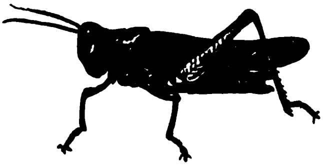

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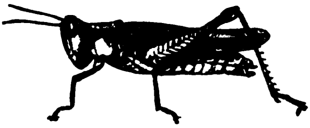

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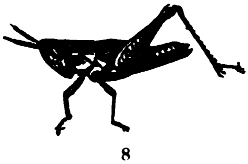

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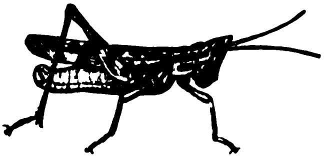

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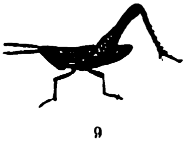

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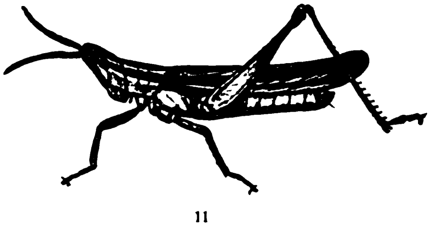

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1. *Dracotettix monstrosus*, ♀. (Page 50.)
2. *Thrincus* (?) *aridus*, ♀. Side view. (Page 78.)
3. *Thrincus* (?) *aridus*, ♀. Dorsal view. (Page 78.)
4. *Boötettix argentatus*, ♀. (Page 58.)
5. *Boötettix argentatus*, ♂. (Page 58.)
6. *Psoloessa Buddiana*, ♀. (Page 61.)
7. *Œdipoda* (?) *occidentalis*, ♀. (Page 77.)
8. *Eritettix abortivus*, ♀. (Page 56.)
9. *Eritettix abortivus*, ♂. (Page 56.)
10. *Pedioscertetes pulchella*, ♂. (Page 60.)
11. *Mermiria texana*, ♂. (Page 53.)

CONTRIBUTIONS TO THE NATURAL HISTORY OF THE COMMANDER ISLANDS.

BY

LEONHARD STEJNEGER AND FREDERIC A. LUCAS.

(With Plates II–IV.)

A.—CONTRIBUTIONS TO THE HISTORY OF PALLAS' CORMORANT.

BY

LEONHARD STEJNEGER,
Curator of the Department of Reptiles and Batrachians.

About forty years ago the Great Auk (*Plautus impennis*) of the Northern Atlantic became exterminated. A vigorous search has been made for it and its remains; fabulous sums have been paid for skins and eggs; and monographers, among whom some of the most prominent ornithologists, have collected together the most minute facts bearing upon its history, and discussed in extreme detail the number of specimens extant as well as their individual history, so that the latest account of this remarkable bird fills a quarto volume of quite respectable dimensions. There are now on record about eighty mounted specimens, or skins, seventy eggs, and countless bones as being preserved in the various museums of the Old and the New World.

Within the same period another large water bird has become extinct in the North Pacific, without having as yet attracted the attention of the monographers. It is so rare in collections that only four specimens are known to exist in museums, while nobody is the proud possessor of its eggs, and no bones had been found or preserved until I was so fortunate some years ago as to rescue a few of them. Yet, this bird was the largest and handsomest of its tribe. And so little has been known of it that there is not yet printed a detailed and good description of it. The bird which has fared so badly is Pallas's Cormorant, or the Spectacled Cormorant, *Phalacrocorax perspicillatus* Pall.

I have recorded elsewhere (Proc. U. S. Nat. Mus., VI, 1883, p. 65, and Bulletin U. S. Nat. Mus., No. 29, Res. Orn. Expl. Kamtsch., p. 180) my reasons for considering this species extinct and the causes which led to its extermination. It seems as if the very causes which terminated the existence of the Great Auk worked the same result in Pallas's Cormorant, and it is even probable that if the latter, at some earlier period, also inhabited the other Aleutian Islands, as is most likely, volcanic eruptions may have played a rôle in this drama as well as in that of the Great Auk. True, the latter was entirely deprived of its power of flight, but it is evident both from the measurements of the skins as well as of those of the bones, given below, that the wings of this cormorant were disproportionately small. Steller speaks of its great bulk of body and its weight, which varied between twelve and fourteen pounds,* so that one single bird was sufficient for three starving men of the shipwrecked crew.

With this bulk it combined an unusual "*stoliditas*," but it is pretty clear that this stupidity, which made them such an easy prey, was due more to their slowness of locomotion on land and in the air than to any special temperament or dullness of intellect. The natives of Bering Island inform me that the meat of this species was particularly palatable compared with that of its congeners, and that consequently, during the long winter, when other fresh meat than that of the cormorants was unobtainable, it was used as food in preference to any other. In brief, all the circumstances combined to make short work at exterminating this bird at its last refuge, for there is no evidence that it has ever been found during historical times in any other locality than Bering Island. The result was that Pallas's Cormorant, which was found by Steller and his shipwrecked comrades on that desolate island in 1741, and which at that time—that is, before man ever visited its rocky shores—occurred there in great numbers, "*frequentissimi*," as Steller says, became extinct in about a hundred years from its discovery. The history of this bird forms an interesting parallel to that of the great northern sea-cow (*Rytina gigas*).

Up to 1837 or 1839 Steller seems to have been the only naturalist who had seen this bird, for, although naming it in his Zoographia, all Pallas knew of the species was derived from Steller's observations, whose description he merely quotes. It is, then, safe to conclude that it was not among the many water birds collected by Billings's expedition, which brought home such rich spoils from the Kuriles and the Aleutian Island, but which did not touch at Bering Island. In the above-mentioned year Captain Belcher, with the *Sulphur*, visited Sitka, and was there presented by Kuprianoff, the Russian governor, with one of the specimens of this bird in his possession. This specimen is evidently the one now in the British Museum, while the others went to the St. Petersburg Academy, from which one was again secured by the Leyden Museum. Although obtained from the governor in Sitka, there is nothing to indicate whence came the specimens; but inasmuch as Bering Island at that time belonged to the administrative district of Sitka, at which port all the furs were received from that island before being shipped to Europe, all vessels from Bering Island consequently first stopping at Sitka, there is every probability that the specimens in question were collected on that island. This conclusion is corroborated by the manner in which *P. perspicillatus* and *Leucosticte griseogenys* are mentioned together.

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* The average length of wing of adult *Ph. perspicillatus* is 355^{mm} (see table beyond) and the weight 12 to 14 pounds. Compare with this the fact recorded by me (Orn. Expl. Kamtsch., p. 186) that *Ph. urile*, the nearest ally of the present species, weighs only 5 pounds, with a length of wing of 300^{mm}.

So far as known, these are the only specimens in existence, viz: Two in the museum of the Imperial Academy of Sciences in St. Petersburg; one in the British Museum, London; one in the "Rijks Museum," Leyden, Holland.

Several pictures of Pallas's Cormorant have been published. A large colored plate by Wolf, from the British Museum specimen, is in Elliot's Birds of North America, a reduced wood engraving copy of which is given in the Standard Natural History (or Riverside Natural History), vol. IV, p. 192. The same specimen is also figured in two different positions by Gould in the Zoology of the voyage of the *Sulphur*, and poorly copied in Reichenbach's "Natatorum Novitiæ." In Schlegel's "Dierentium," p. 281, there is a wood-cut, probably taken from the Leyden specimen. According to Dr. Finsch (Abh. Natur. Hist. Ver. Bremen, III, 1872, p. 20) this species, undoubtedly from one of the St. Petersburg specimens, is represented on plate V, Fig. 4, of Brandt's "Icon. Av. Ross," a work which was never published.

Dr. Theodor Pleske kindly writes me in regard to the specimens in St. Petersburg:

Through the kind offices of Dr. Pleske I have received from Professor Brandt's heirs that part of the manuscript of his unpublished monograph of the Cormorants, which relates to the species in question, with permission to publish it. The description is very full, and being the only accurate and detailed description of the species I take great pleasure in printing it in full. In order to avoid any errors I deem it best to publish it in the language in which it was originally written. I have preceded this description with a synonymy which is thought to be nearly exhaustive.

Phalacrocorax perspicillatus PALL.

1826.—*Phalacrocorax perspicillatus* PALLAS, Zoogr. Ross. As. II, p. 305.—GOULD, Zool. Sulphur, p. 49, pl. xxxii (1844).—BONAPARTE, Consp. Av. II, p. 167 (1855).—*Id.*, Compt. Rend., 1856, XLIII, p.—TACZANOWSKI, Orn. Faun. Vert. Sibir., p. 66 (1877).—*Id.*, Bull. Soc. Zool. France, 1877, p. 41.—RIDGWAY, Nomencl. N. Am. B., p. 51 (1881).—*Id.*, Man. N. Am. B., p. 81 (1887).—COUES, Check L. and Dict., p. 118 (1882).—*Id.*, Key, 2 ed., p.—(18—).—*Id.*, Auk, 1884, p. 144.—*Id*, Key, 3 ed., p.—(18—).—STEJNEGER, Pr. U. S. Nat. Mus, VI, 1883, p. 65.—*Id.*, *ibid.*, x, 1887, p. 138.—*Id.*, Auk., 1884, p. 173.—*Id.*, Orn. Expl. Kamtsch., pp. 180, 318 (1885).—*Id.*, Stand. Nat. Hist., IV, p. 191, Fig. 92 (1885).—BAIRD, BREWER, & RIDGWAY, Water B., N. Am., II., p. 164, fig. (1884).—A. O. U. Code and Check L., p. 351 (1886).

1858.—*Graculus perspicillatus* LAWRENCE, in Baird, B. N. Am., p. 877 (1858).—SCHLEGEL, Mus. P.-Bas, Pelec., p. 17 (1863).—*Id.*, Dierentuin, p. 281, fig. (1871).—ELLIOT, B. N. Am., pt. —, pl. 50 (——).—GRAY, Hand-l., III, p. 127 (1871).—COUES, Key, 1 ed., p. 304 (1872).—*Id.*, Check L., p. 101 (1873).

1850.—*Graculus urile* REICHENBACH, Natat. Novit., pl. XVII, Figs. 2311 and 2312 (*nec* GMEL.) (Cf. BONAP., Consp. Av. I, p. 168, and A. B. MEYER, Index Reichenb., p. 44; no name on the plate!)

Brandt's description, here published for the first time, is literally as follows:

DESCRIPTIO.

Carbo perspicillatus specierum generis Carbonum hucusque notorum maximam sistere videtur. Corporis enim mole *Carborem cormoranum* superat.

Rostrum robustum, satis altum, modice elongatum, nigrum, apice summo albicanti-corneo, basi marginibusque tamen corneo. Culminis basis supra rotundata, convexa, medium supra subrectum. Culminis margine anterioris subrecti apex supra dertri basin haud prominens sed angusta sutura distinctum. Culminis superior facies nec non paratonorum atque gnathidiorum apice uncato, acuto, elongato, gonydem in rostro clauso longe superante. Exterior facies tenuiter per longitudinem subelevato-striata, striis teneris plus minusve parallelis. Dertrum in baseos faciei superioris lateribus sulco arcuato satis profundo exaratum, in facie laterali autem sulcis parum distinctis, transversis, obliquis, subparallelis 2 vel tribus instructum. Gonys subrecta et in medio vix prominens. Myxa apice truncato rotundata.

Frontis antica pars, genae, regio ophthalmica, spatium angustum pone oris angulum, mentum et gulae summum initium nuda cinnabarina, albo et coeruleo varia ut in gallopavone (Steller). In genis pennæ brevissimae, solitariae, sparsae. Oculi annulo membranaceo, nudo, elevato, subelliptico, lato, albo, perspicillum quodammodo aemulante, cincti. Inter oculi annulum et superiorem oris anguli marginem calvum spatium triangulare pennis brevibus obsessum.*

Alae complicatae vix ad uropygii posteriorem extremitatem porrigentes.

Cauda inverti subspathulata, basi angustior, e pennis 12 composita.

Tarsi pro magnitudine admodum breves.

Color in universum ater. Capitis anterior pars cum gula initio violaceonitens. Capitis posterior pars, collum, pectus, abdomen, dorsum, crissum et uropygium obscure vel aureo-viride nitentia luce angulo plus minusve recto in observatoris oculos reflexa plus minusve obscure violascentia. Pennae parapterii et humerales nec non tectrices alarum supra e subpurpurascente violaceo-nitidae, anguste nigro-marginatae, rotundatae vel obtuse subacuminatae, apice fere subellipticae. Remiges primariae et tectrices alarum inferiores e subfuscescente nigrae. Remiges secundariae nigrae, limbo externo plus minusve subnitido purpurascente violaceae. Cauda cum tectricibus atra, subopaca. Rectricum scapi supra ad apicem usque albi, marginibus nigricantibus, apice autem cum inferiore facie nigri. Frontis posterioris partis et verticis pennae dilatatae medio atrae marginibus subpurpureo-violascente vel interdum subvirescente nitidulae in cristam subtetragonam antice angustiorem basi latam, suberectam retrorsum spectantem, postice subtruncatam, 3″ fere longam apice 2″ latam insignem elevatae. In occipitis postrema parte et cervicis summo crista alia 2″ longa 2¼″ lata, flabelliformis, basi angustior e pennis satis latis atris margine virescentibus media plus minusve subpurpurescentibus formata, retrorsum spectans conspicitur. In frontis medio supra oculos, in temporibus et in lateribus superioris partis colli pennae candidae angustae ½ ad ¾ lineae latae elongatae, 1–3″ longae, lineares, acutae, fere subsetaceae, subsolitariae sparsae inveniuntur, quarum quae in fronte sunt breviores, interdum pollicares vel paulo ultra; quas vero in collo observare licet multo longiores, 2–3″ longi evadunt. Praeterea vero etiam in temporibus et collo pennulae albae breves penicilliformes apice tantum radiolatae. In femoribus macula candida triangularis a quovis hypochondrio late incipiens et ad crus usque angulo acuminatio extensa e pennis longis, valde acuminatis apicibus radiolis rarioribus compositis formata. Pedes atri unguibus obscure corneis.

Feminae Stellero auctore et cristis et membrana perspicilliformi, alba oculos late cingente carent.

Pondus Stellero auctore 12–14 librarum.

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*Ob hancce annulum peculiarem Pallasius haud incommode speciem nostram perspicillatum nominavit.

Mensurae avis adultae in Museo Academico servatae.

A rostri apice ad caudae apicem	39″	
ad frontem	3″	6‴
ad oris angulum	4″	½‴
A fronti ad caudae basin	27″	10‴
dorsi initium	14″	7‴
Ab alarum angulo humeali ad remigum apicem	13″	3‴
Caudae longitudo	7″	5‴
Tarsi longitudo	2″	6‴
Longitudo digiti interni ad unguis basin	1″	3‴
secundi	2″	1‴
tertii	3″	1‴
quarti seu externi	4″	2‴

I have thought it useful to tabulate the measurements given by the various describers reduced to millimeters:

	Brandt, Specimen in Museum St. Petersburg.	Gould, Specimen in British Museum.	Schlegel, Specimen in Leyden Museum.
Total length	1055	914	
Bill to forehead	95		
Bill to gape	109		
Bill		102	81
Height of bill in middle			18
Wing	359	356	351
Tail	201	229	189
Tarsus	68	76	
First toe, without claw	34		
Second toe	56		
Third toe	89		
Fourth toe	113		108

I have already stated that no bones of this species have been preserved in museums until I was so fortunate as to find a few fragments evidently belonging to this bird. These Mr. Frederic A. Lucas has kindly undertaken to describe and illustrate in the second part of this paper.

The conditions under which they were found I have already described elsewhere (Deutsche Geograph., Bla'tte VIII, p. 272), but a brief account may not be out of place in the present connection.

During my circumnavigation of Bering Island I landed on September 1, 1882, at Pestshanij Mys near the northwestern extremity of the island. Ascending the steep coast escarpment which is here about 35 feet high, I found near the edge of the terrasse a rather extensive deposit of bones of various mammals and birds arranged in thin layers of sand and sod alternating. The average thickness of the deposit was about 2 feet, and the present area covered in the neighborhood of 600 square feet, though it was evident that it was formerly of much greater extent, the ocean having encroached upon the land and carried away great portions of the terrasse. The bones were in fairly good condition, some of the smaller and more delicate ones even excellently well preserved, and none of them showed signs of violence. There were bones of the Arctic Fox, the Sea-otter, the Sea Lion, and other species of seals, as well as various kinds of water birds. Among the latter a particularly large pelvis of a *Phalacrocorax* at once attracted my attention, and as I had had Pallas's Cormorant on my mind since I started from Washington I was not slow in concluding that I had to do with the bones of this bird. Had I had time to dig out the whole deposit I should probably have obtained more bones, but with the above suspicion I did as much digging and collected as many bird bones as the circumstances would allow.

A full account of this find is given by Mr. Lucas in his report which forms the remaining portion of this article.

B.—DESCRIPTION OF SOME BONES OF PALLAS' CORMORANT (*PHALACROCORAX PERSPICILLATUS.*)

BY

FREDERIC A. LUCAS,

Assistant Curator of the Department of Comparative Anatomy.

Dr. Stejneger has very kindly placed in my hands for description the bones above mentioned. They are as follows:

Rostral portion of cranium in advance of the fronto-nasal hinge, with attached palatines.
Lower mandible.
Right ramus of lower mandible.
Two nearly complete sterna.
Right coracoid.
Right humerus.
Left humerus of another individual.
Right ulna.
Right fused metacarpals.
Right fused metacarpals, very imperfect.
Three pelves, lacking pubic bones.
Left femur.
Two left tibiæ.
Right tibia.
Two left tarsi.
Second cervical vertebra.
Third cervical vertebra.
Ninth (?) cervical vertebra.

The more important of these are figured on the accompanying plates, all figures being of natural size, and drawn by the author.

The bones, although stained, are in a good state of preservation, being but slightly weathered, and all are from thoroughly adult individuals.

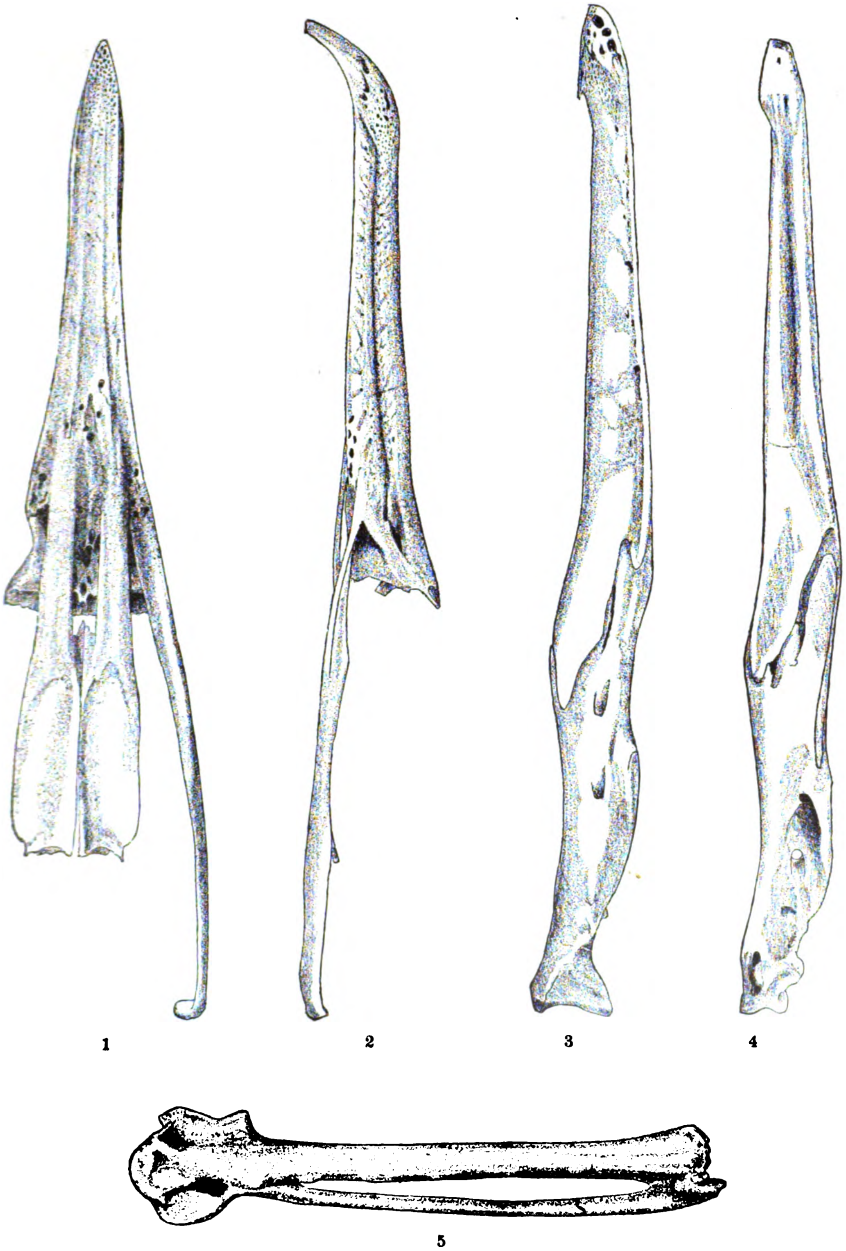
For the better and briefer description of these bones they have been compared with those of an adult *Phalacrocorax carbo*, and the opportunity has been taken to test, to some extent, the value of the subgenera *Urile* and *Phalacrocorax*, by comparing at the same time the corresponding bones of *P. urile* and *P. dilophus*.

The former bird is, for the species, large and the latter somewhat undersized, although adult.

The rostrum of *perspicillatus* is nearly as long as in *carbo*, but much more slender, and is readily distinguished from it by the deep, lateral, longitudinal groove characteristic of the sub-genus *Urile*.

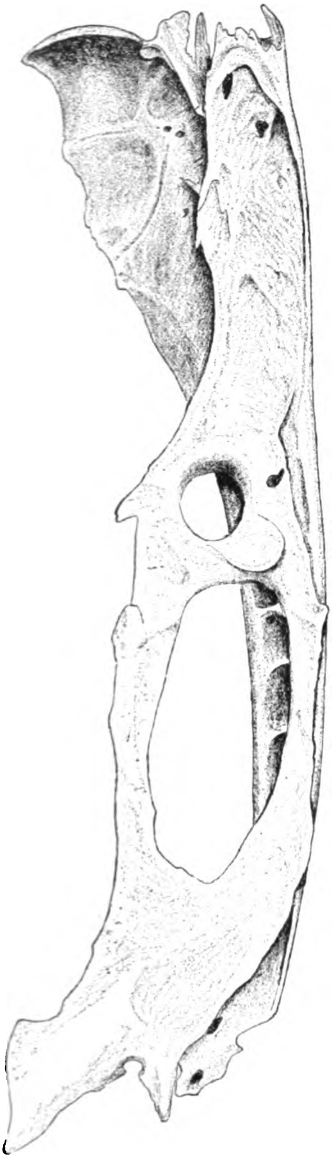
The under surface of the rostrum is less grooved, longitudinally, than that of *carbo* and much less so than that of *P. urile*.

The palatines are as long as those of *carbo*, anteriorly narrower and



BONES OF PALLAS'S CORMORANT—NATURAL SIZE. (Page 88.)

1. Ventral aspect of rostrum.
2. Lateral aspect of rostrum.
3. Right ramus of lower mandible, external aspect.
4. Right ramus of lower mandible, internal aspect.
5. Right metacarpals.



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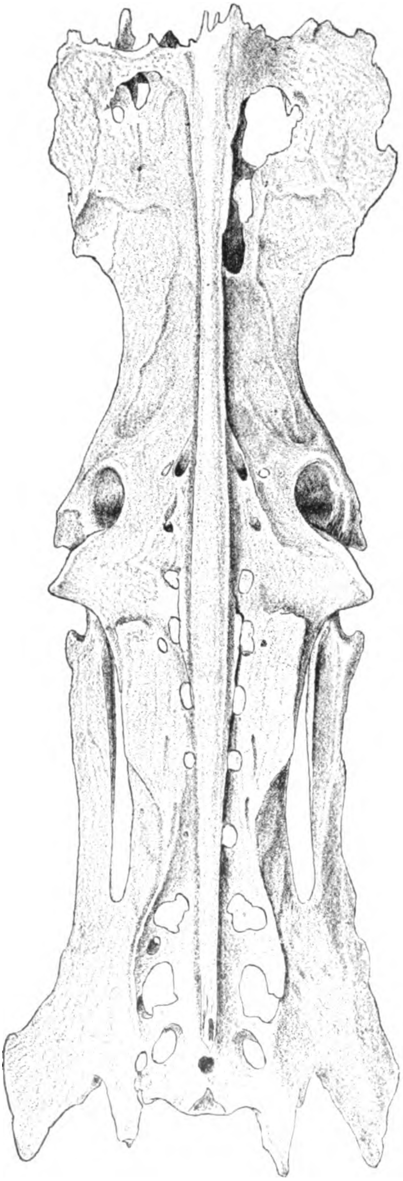

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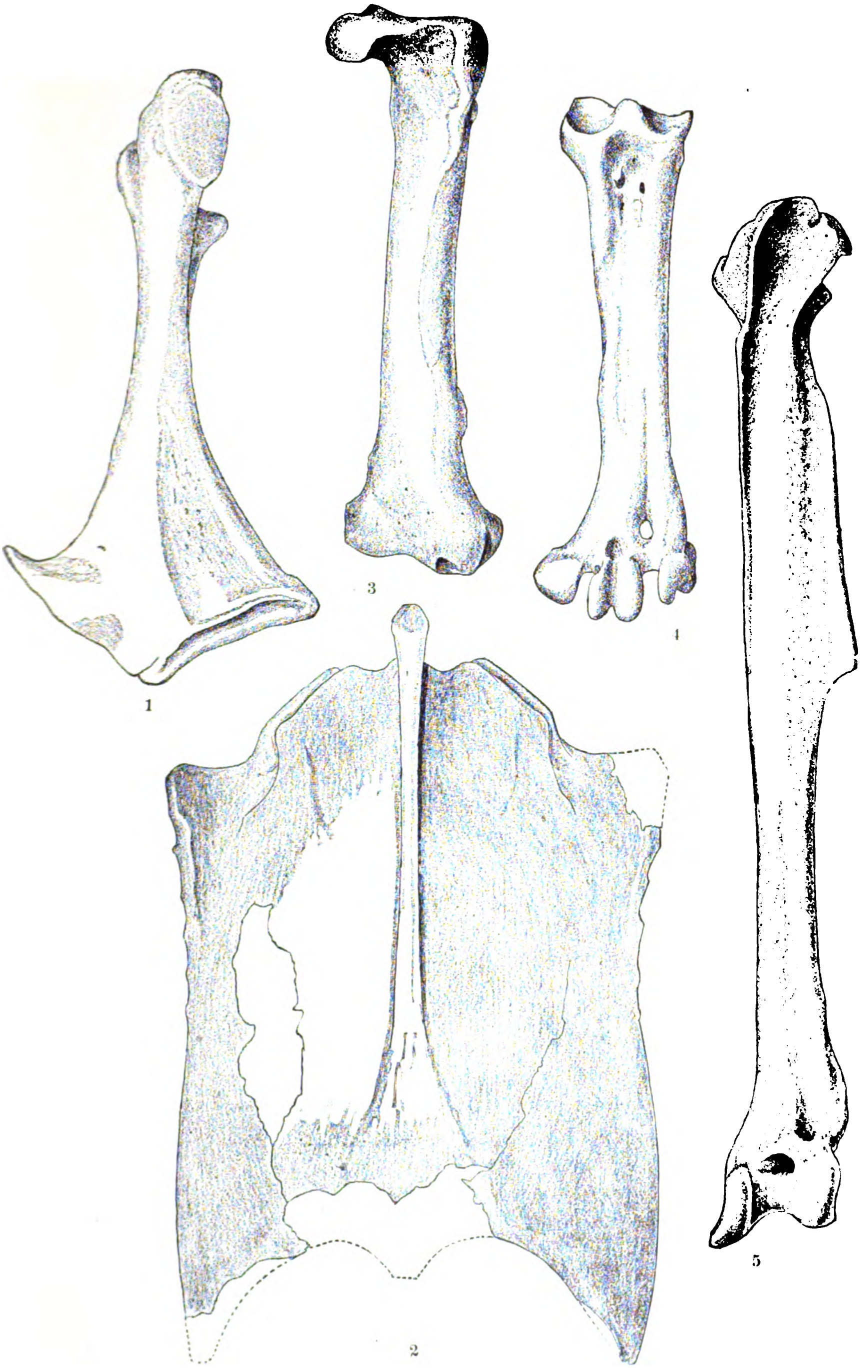
Bones of Pallas's Cormorant—natural size. (Page 88.)

1. Left lateral aspect of pelvis.
2. Dorsal aspect of pelvis.



Bones of Pallas's Cormorant—natural size. (Page 88.)

1. Right coracoid, ventral aspect.
2. Sternum, ventral aspect.
3. Femur, anterior aspect.
4. Tarsus, anterior aspect.
5. Tibia, anterior aspect.

posteriorly wider, conforming in pattern very nearly to those of *urile*, while *dilophus* resembles *carbo* in this respect.

The trans-palatine angle is more rounded than in *carbo*, much more than in *urile*, resembling in this *dilophus*.

The inner portion of the post-palatine is less produced ventrally than in *carbo*, and the pterygoid articulation wider and flatter than in *carbo*, the palatine thus lacking the keel present in *carbo*.

The same differences are found between the same parts of *urile* and *dilophus*.

The maxillo-jugal bar is as long as that of *carbo* but more slender.

The lower mandible is slightly shorter and decidedly weaker than that of *carbo*, and the lower mandible of *urile* is proportionately still weaker than that of *dilophus*.

The dentary portion of the mandible is more deeply grooved along the inner surface than that of *carbo*, being comparatively the same as in *urile*.

The cutting edges of the mandible are comparatively straight as in *carbo* and *dilophus*, but *urile* differs from all three in having the mandible distinctly recurved.

The sternum is transversely flatter than that of *carbo*, being a trifle more flattened even than that of *urile*. The carina is also shorter than in *urile*, but in size and general appearance the sterna of *perspicillatus* and *urile* resemble one another very closely.

From manubrium to meso-xiphoid the sternum is 13^{mm} shorter than that of *carbo*, being exactly as long as that of *urile*.

The proportion of carina to total length is shorter than in either *carbo* or *urile*, the sternum from anterior end of carina to meso-xiphoid measuring 2^{mm} less than that of *carbo* and 4^{mm} less than that of *urile*.

Between the costal borders the sternum is slightly wider than in either *carbo* or *urile*.

The rudimentary manubrium, like that of *urile*, lies in the plane of the body of the sternum, while in *carbo* and *dilophus* the manubrium lies in the plane of the keel.

If a line be drawn between the costal processes it will be found that the coracoid articulations project less beyond this line and form a more obtuse angle with one another than they do in *carbo*, and the same is true of *urile* as compared with *dilophus*. The sternum is non-pneumatic, as in *urile*, but in *carbo* and *dilophus* good-sized foramina pierce its dorsal face just back of the ridge formed by the coracoidal groove.

It is certainly interesting to find the sterna of these two representatives of the sub-genera *Phalacrocorax* and *Urile*, respectively, agreeing with one another in these slight structural points.

Articulations are present for five pairs of ribs, the same number as in *carbo*. One specimen of *urile* has four pairs of articulations, another has five on the left side and four on the right, and *dilophus* has but four pairs of costal facets.

The number of ribs articulating with the sternum is, however, subject to slight variation, especially among water birds, and without an extensive series of specimens it is a little difficult to be sure of the normal number.

The coracoid is of the same length as that of *carbo*, 10^{mm} longer than in *urile;* but, while the proximal end is but little heavier than in *carbo*, the shaft and especially the distal end are much more massive.

The epicoracoid is prolonged upward into a sharper hook than in any of the other species at hand, but this process is subject to considerable variation with age or in various individuals.

One humerus is a little longer than that of *carbo*, the other is of exactly the same length; both are much stouter, especially in the proximal half.

The humerus is practically non-pneumatic, the foramina being very minute, while the pneumatic foramina of *carbo*, though not large, are readily seen.

The humerus of *urile* differs from that of *dilophus* precisely as that of *perspicillatus* from *carbo.*

The ulna is distinguishable from that of *carbo* only by its greater weight, and the same may be said of the humerus of *urile* as compared with that of *dilophus.*

The fused metacarpals are slightly shorter and slightly stouter than in *carbo*, and here again the same differences are observable between the metacarpals of *urile* and *dilophus.*

The "sacrum," as a whole, is as long as that of *carbo*, but its component parts are more heavily built.

It comprises six pre-sacrals, two true sacrals, and nine post-sacrals, and the three "sacra" of *perspicillatus* agree with one another in these particulars.

Phalacrocorax carbo has six pre-sacrals, two true sacrals, and nine or ten post-sacrals. *P. urile* has six, two, eight, and *dilophus* six, two, nine.

The hypapophyses of the anterior three vertebræ have been broken off, but although the compressed centra are larger than in *carbo*, the hypapophyses seem to have been smaller.

The six pre-sacrals present few salient characters, but the diapophyses of the fourth vertebræ lie at right angles to the vertebral column, while in the three other species the diapophyses of this vertebra are directed forward.

The sacral and immediate post-sacral vertebræ vary in the development of their parapophyses in all four species under consideration.

In all three specimens of *perspicillatus* the two true sacrals bear no parapophyses, while the two succeeding vertebræ have them extended to, and ankylosed with, the ilium.

The diapophyses and parapophyses of these vertebræ are united by a thin plate of bone, but that this is due to age is shown by the condition obtaining in the other species.

These latter also indicate that the canal formed by these processes, the centra of their vertebræ, and the ilium, is larger on the right side than on the left, and that it is first obliterated on the left side.

In *carbo* neither the sacrals nor the second post-sacral bear parapophyses, although these are present on the first post-sacral, uniting it firmly with the ilium.

In one example of *urile*, slender, but well marked, parapophyses connect the two sacrals with the ilia.

In another and much smaller specimen the second sacral has a parapohysis on the left side, there being no parapophyses on the first sacral.

In both specimens of *urile* the first, but not the second, post-sacral bears parapophyses. Finally, *dilophus* has strong parapophyses on the second sacral and first post-sacral, but none on the second post-sacral.

The variation in the sacral region of these specimens is not only interesting in itself, but interesting from the fact that it is unusual for parapophyses to be present at all on the true sacral vertebræ of birds.

Viewed from above the ridge formed by the confluent spinous processes of the "sacrals" is wider than in *carbo*, and the interpophysial foramina are nearly closed, while in *carbo* they are very open.

Although these characters depend to some extent on age, they do not entirely, and the same differences exist between the "sacra" of *urile* and *dilophus* as between those of *perspicillatus* and *carbo*.

The pelvis is much more rugose than in *carbo*, all attachments for muscles being strongly emphasized.

The anti-trochanter is placed farther back than in *carbo*, and is much more rounded, thus affording more play to the femur.

Just back of the anti-trochanter the outer edge of the ilium is raised and thickened, forming a flat, subtriangular spot about an inch in length.

This peculiar flattening of the ilia, taken in connection with the size and rugosity of the pelvis, is sufficient to distinguish it from that of other species.

The ilium of *urile* has a flattened spot, but proportionately smaller than in *perspicillatus*.

Back of this flattened portion the dorsal edge of the ilium is bent outward, making this part of the ilium outwardly concave, where in *carbo* it is convex.

The post ilia of *carbo* and *dilophus* round gently outward and downward throughout their entire length from their junction with the diapophyses.

Viewed from the side the dorsal outline of the "sacrum" is slightly decurved, while that of *carbo* is very nearly straight, and the same difference exists between *urile* and *dilophus*.

The acetabulum is slightly larger and forms more nearly a perfect circle than in *carbo*.

The ilio ischiatic foramen is subelliptical and wide, the longitudinal diameter being nearly twice the vertical, while in *carbo* this foramen is more pointed posteriorly, and narrower, the length being more than three times the height.

In consequence of the size of this foramen the distance from the dorsal edge of the ilium to the ventral edge of the ischium is much greater than in *carbo.*

The bar of the ischium bounding the obturator space is sharp-edged, rugose, and concave exteriorly on the posterior portion, while the corresponding portion of the ischium in *carbo* is comparatively smooth and slightly convex posteriorly.

The posterior border of the ischium is straighter than in *carbo* and the ilio-pubic articulation one-third shorter.

The femur is 5^{mm} longer than that of *carbo,* in every way much more massive, and with all the muscular ridges more pronounced, while curiously enough it is more pneumatic, having several foramina in the ventral aspect of the neck that are lacking in *carbo.*

There is nothing to distinguish the femur of *urile* from one of *dilophus* of the same length, and of the two that of *dilophus* is slightly the heavier.

But in the specimen of *urile* in which the humerus corresponds in length to that of *dilophus,* the femur and tibia are both longer and heavier than in *dilophus,* and the tarsus a little lighter.

The phalanges, again, are more massive in *urile* than in *dilophus.*

The smallest of the three tibiæ is slightly longer than that of *carbo,* the cnemial crest is more expanded, and the cnemial ridges farther apart and more pronounced.

The distal extremity of the tibia is also wider than in *carbo,* but at its smallest diameter the shaft is no larger.

The muscular ridges and grooves are more marked than in *carbo,* but in the absence of more material and making due allowance for individual variation, it is difficult to point out characters which definitely distinguish the tibiæ of the two birds.

The tarsus is of the same length as in *carbo,* but much wider, and, as throughout, with all the ridges more pronounced.

Little can be said concerning the three cervical vertebræ, except that unlike the other bones they are less strongly built than the corresponding bones in *carbo.*

From the foregoing notes it will be seen that the differences existing between corresponding bones of *perspicillatus* and *carbo* also exist between the same bones of *urile* and *dilophus,* and that conversely *perspicillatus* and *urile* agree with one another as do *carbo* and *dilophus.*

The sub genera *Phalacrocorax* and *Urile,* therefore, seem to rest on good structural foundations, each being characterized by internal as well as external characters.

Unfortunately no skull of *perspicillatus* is to be had, but the crania of *carbo* and *dilophus* agree with one another, while differing strikingly from the cranium of *urile.*

From the harmony of the other parts it is not assuming too much to suppose that the skull of *perspicillatus* would resemble that of *urile.*

With the exception of the sternum the greater size of the bones distinguishes those of *perspicillatus* from those of *urile*, while well-marked differences of shape or proportion exist between the corresponding bones of *perspicillatus* and *carbo.*

P. perspicillatus appears to have been a much heavier bird than *carbo*, and a bird of weaker flight; with more robust and muscular legs, and a more slender and more feeble head and neck.

In comparing the following tables of measurements it must be said that they do not adequately convey the impression produced by a comparison of the bones themselves. Thus, in the measurements of the lower mandible the greatest vertical width is comparatively as great as in *carbo*, but from this point the ramus tapers rapidly either way so that as a whole the mandible is much weaker than that of *carbo.*

So too with the humerus, where the greatest proximal width is only 2^{mm} greater than in *carbo*, although the bone in its entirety is much more stoutly built.

Measurements (in millimeters) of corresponding bones of Phalacrocorax perspicillatus, carbo, urile, and dilophus.

[All measurements are in a direct line and not along curves.]

	P. perspicillatus (National Museum, 17041).	*P. carbo* (Yale College Museum, 535).	*P. urile* (National Museum, 12502).	*P. dilophus* (National Museum, 18050).
Rostrum:				
Tip of mandible to extremity of maxillo-jugal bar.	134	140	108	105
Maxillo-jugal bar	68	69	56	56
Tip of mandible to posterior end of palatine	109	117	91	86
Width across nasals, at fronto-nasal hinge	21	20	13	14
Lower mandible:				
Length of ramus	139	144	112	110
Greatest height of ramus	13	13	9	12
Sternum:				
Anterior end of carina to meso-xiphoid	104	119	97	91
Manubrium to meso-xiphoid	83	97	84	76
Depth of carina	28	33	31	26
Width across articulations of first rib	64	66	64	54
Width across articulations of fourth rib	63	59	60	51
Coracoid:				
Length	84	87	71	70
Breadth of sternal articulation	25	25	24	20
Greatest distal breadth	18	17	16	13
Humerus:				
Length	170	170	140	140
Greatest proximal breadth	30	28	25	23
Greatest diameter midway between extremities.	11	9	10	8
Greatest distal breadth	21	20	18	17
Ulna:				
Length	190	178	....	....
Greatest proximal breadth	21	18	....	....
Greatest diameter of shaft midway between extremities	8	7	....	....
Pelvis:				
Greatest length of ilium	151	152	122	120
From anterior border of ilium to external angle of anti-trochanter	72	65	58	49
Greatest width of ilia in advance of acetabula	48	44	42	38
Least width of ilia in advance of acetabula	23	23+	19	18
Width between outer extremities of anti-trochanters	43	46	37	33
Length of ilio-ischiatic space	42	41	32	38

Measurements (in millimeters) of corresponding bones of Phalacrocorax perspicillatus, carbo, urile, and dilophus.

[All measurements are in direct line and not along curves.]

	P. perspicillatus (National Museum, 17041).	*P. carbo* (Yale College Museum, 535).	*P. urile* (National Museum, 12502).	*P. dilophus* (National Museum, 18050).
Pelvis—Continued:				
Greatest width of ilio-ischiatic space	18	13	13	10
From dorsal edge of ilium, above the ilio-ischiatic foramen, to ventral edge of ischium	28	23	23	19
Length of ilio-pubic articulation	21	28	15+	23
Between posterior terminations of ischia	46	40	42	40
Femur:				
Length	74	70	66	55
Greatest proximal width	21	19	16	15
Greatest diameter midway between extremities	11	10	9	8
Greatest distal width	22	18	16	15+
Tibia:				
Length	140	127	117	102
Width across cnemial ridges	15	13	11	10
Width at distal end of articulation with fibula	15	13	11	13
Least transverse diameter of shaft	8	8	7	7
Distal width	16	15	12	13
"Tarsus:"				
Length	71	72	60	62
Proximal transverse width	19	16	14	14
Distal width	20	18	15	14

DESCRIPTION OF TWO NEW SPECIES OF SNAKES FROM CALIFORNIA.

BY

LEONHARD STEJNEGER,

Curator of the Department of Reptiles and Batrachians.

In 1861 Prof. E. D. Cope established the genus *Lichanura* for *L. trivirgata*, which at the same time he described as new, from specimens in the Smithsonian Institution and the Philadelphia Academy of Sciences. Of the types in the former, collected by J. Xantus at Cape St. Lucas, Lower California, only one specimen now remains (U. S. Nat. Mus., No. 15502), and since then only one additional specimen has been received, viz, No. 12602, which was collected by Mr. L. Belding at La Paz. For this genus Prof. Cope, in 1868 (Proc. Ac. Philada., 1868, p. 2), instituted the family *Lichanuridæ*, but afterwards, having been able to study the anatomy of these and allied forms, he referred *Lichanura* to the *Boidæ*. Its external distinctive characters are given as: Tail prehensile, [though in but a slight degree]; scales smooth; no labial fossæ; muzzle and front scaled; nasal plates meeting (Bull. 32, U. S. Nat. Mus.).

To the type species the same author, in 1868 (*l. c.*), added two more species, *L. myriolepis* and *L. roseofusca*, the type specimens of which appear to be in his private collection. The distinguishing characters were derived from differences in the number of scale rows, labials, and scales composing the orbital ring, as well as in the coloration. These two species which, like the type, came from Lower California, are entirely overlooked by Bocourt in his great work on the Reptiles of Mexico (Mission Scientif. au Mexique, Rech. Zool, etc., 1882), while Garman (North Amer. Rept., Ophid, 1883) simply enumerates them as synonyms of the original type species. Besides the short description of *L. trivirgata* in Jan's Iconogr. génér. Ophid., 2^e livr., 1865 (pp. 69 and 70), reproduced in Bocourt's work already referred to (p. 514), nothing of importance seems to have been published in regard to these interesting snakes. It should be remarked, however, that Professor Cope still adheres to the distinctness of the species described by him (see Bull. 1, U. S. Nat. Mus., 1875, p. 43, and Bull. 32, 1887, p. 65).

From the above it will be seen that the genus *Lichanura*, the only North American genus of the family *Boidæ*, has hitherto not been recorded from the United States. It was, therefore, very interesting to receive from Miss Rosa Smith a *Lichanura*, from San Diego, and from Mr. C. R. Orcutt another from the same locality, as well as a third one collected in the Colorado Desert. Upon examination the latter proved to be quite different from the species hitherto described, and I propose to call it[*] *Lichanura orcutti.*

Lichanura orcutti sp. nov.

DIAGNOSIS.—Scales in 33 to 35 rows; eye encircled by 9 or 10 scales; loreals[†] 4; labials $\frac{13}{15}$; gasterosteges 232; anal entire; urosteges 45, entire.

HAB.—Colorado Desert, San Diego County, California.

Type.—U. S. National Museum, No. 15503; C. R. Orcutt coll., April, 1889.

Description of type specimen.—Rostral plate very prominent, recurved, pentagonal, its nasal border twice as long as its labial; eye surrounded by a ring of scales of nearly equal size, 10 on the right side, but only 9 on the left; between the posterior nasal and the middle preocular two large loreal scales, and under the posterior one, wedged in between it, the middle and lower prefrontals, and fourth, fifth, and sixth supralabials, a somewhat smaller subloreal; over the posterior loreal a superloreal of medium size; nasal divided, the anterior plate meeting the one of the other side; back of these a pair of rather large anterior prefrontals followed by four smaller posterior prefrontals, or what corresponds to these plates where a frontal exists, the outer ones being larger than those in the middle; posterior to these the head is covered with numerous rather irregular scales; supralabials 13, the first four highest; infralabials 15, gradually diminishing in height from the pair joining the triangular mental; mental fissure separating four pairs of scales; scales of body smooth, in 33 to 35 longitudinal rows, the inferior on each side slightly larger than the rest; gasterosteges narrow, 232; anal small, entire; tail short, blunt; urosteges 45, entire.

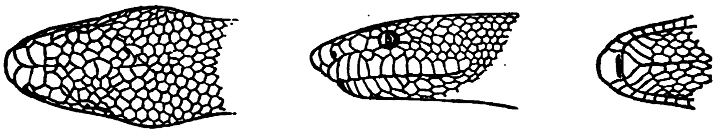


Fig. 1.—*Lichanura orcutti.*

Dimensions.—Total length, 870^{mm}; length of tail from anus, 110^{mm}; diameter of eye, 3^{mm}; from tip of muzzle to anterior border of eye, 11^{mm}; proportion of last two measurements = 1 : 3.7.

Coloration.—Ground color light bluish gray, with a light brownish wash on the upper surface; three longitudinal ill-defined, zigzag bands of a pale raw umber brown running the whole length of the body, the middle one starting between the eyes running to the end of the tail, the lateral ones starting on the temporal region becoming obscure on the tail; top of muzzle and occasional blotches between the bands of the same color; whole underside, except the gulars, mottled irregularly with blotches of a dark neutral tint.

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[*] The diagnosis, reprinted from advance sheets of the present article, is published in the "West American Scientist."

[†] By loreals are here meant all the scales situated between the posterior nasals, the supralabials, the preorbitals, and the scales corresponding to the prefrontals, without reference to their origin; in the present case I think there are only two loreals proper, while the subloreal is only a detached portion of the fifth supralabials, and the supraloreal a part of the prefrontals.

Of the forms which compose this genus the present species appears to be the most highly differentiated, the most distinctive feature being the elongation of the snout and the prominence and shape of the rostral. From the *L. trivirgata*, *myriolepis*, and *simplex* group, it differs more particularly by the low number of scale rows and loreals. In these respects it seems to agree very well with *roseofusca*, from which it differs in the greater number of scales composing the eye ring as well as in coloration. There may be other and more important distinctions, but not having seen a specimen of the latter species, I have to rely solely upon Professor Cope's original description, which is very meager indeed.

A specimen collected at San Diego, Cal., received from Miss Rosa Smith can not be identified with any of the other forms hitherto recognized though combining characters of some of them in such a manner as to make it probable that additional material will prove it to be only a subspecies of *L. myriolepis*. It may be characterized as follows:

Lichanura simplex sp. nov.

DIAGNOSIS.—Scales in 40 rows; eye encircled by 7 or 8 scales; loreals 6; labials $\frac{13}{15}$; gasterosteges 232; anal entire; urosteges 39, entire.

HAB.—San Diego, Cal.

Type.—U. S. National Museum, No. 13810; Miss Rosa Smith, coll., March 5, 1884.

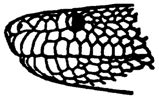

FIG. 2.—*Lichanura simplex.*

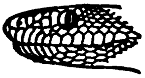

FIG. 3.—*Lichanura trivirgata.*

Description of type specimen.—Rostral plate as in the other species, except *L. orcutti*, pentagonal, its nasal border but slightly longer than its labial; eye surrounded by a ring of 8 scales (on the left side, but 7 only on the right side, the two posterior superorbitals having become fused) the anteorbital being very large; three true loreals, above which two smaller supraloreals; on the right side two rather large subloreals, being the detached upper portions of the fourth and fifth supralabials, while on the left side only part of the fifth is thus separated; nasal divided, the anterior portion meeting the one of the other side; posterior to these are two pairs of rather regular prefrontals followed by the usual small irregular frontal scales of the genus; supralabials 13, the first three (four) highest; infralibials 15; mental small, triangular, mental fissure separating four pairs of scales; scales of body smooth, hexagonal, imbricated, in 40 longitudinal rows, the lower one largest; gasterosteges 232; anal small, entire; urosteges 39, entire.

Dimensions.—Total length, 765^{mm}; length of tail, from anus, 80^{mm}; diameter of eye, 2.5^{mm}; from tip of muzzle to anterior border of eye, 10^{mm}; proportion of last two measurements = 1 : 4.

Coloration.—Uniform drab-brown above, fading into whitish on the under parts.

In spite of the fewer scales forming the eye ring, a feature which seems to be of less importance, the present form appears to agree better with *L. myriolepis* than with *roseofusca.* The scale rows are only two less than in a specimen labeled *L. myriolepis* by Cope himself (U. S. Nat. Mus., No. 14129; San Diego; Charles Orcutt, coll.), and in the numerous loreal scales it also agrees better with the latter. The diameter of the eye shows the same ratio to the distance from the tip of the muzzle in these two forms, thereby differing considerably from *L. trivirgata,* in which the eye is comparatively much larger. From *L. orcutti* the new form differs in the much less produced muzzle and rostral, in the number of scale rows, loreals, and scales composing the eye ring, in the still smaller eye, as well as in coloration.

So far as can be made out from the scanty material there are at least five species, or varieties, the differences of which may be tabulated as follows:

a^1. Eye ring of 9 to 10 scales, or else more than 4 loreals.

  b^1. Eye large, its diameter more than one-third the distance from anterior canthus to tip of muzzle; gasterosteges about 218; color whitish with three blackish-brown longitudinal bands in strong contrast.

1. *L. trivirgata.*

  b^2. Eye smaller, its diameter less than one-third the distance from anterior canthus to tip of muzzle; gasterosteges about 232; color brownish or bluish above, with or without longitudinal bands, which, when present, contrast but little against the ground color.

    c^1. Scale rows 40 to 45; loreals 5 to 7.

      d^1. Eye ring of 9 to 10 scales; scale rows 42 to 45; color bluish gray above, with three longitudinal light-brownish bands.

2. *L. myriolepis.*

      d^2. Eye ring of 7 to 8 scales; scale rows 40; color uniform; brownish drab above.

3. *L. simplex.*

    c^2. Scale rows 33 to 35; loreals 4 (eye ring 9 to 10 scales).

4. *L. orcutti.*

a^2. Eye ring of 7 to 8 scales and 4 loreals.

5. *L. roseofusca.*

It is more than probable that additional material will alter the above results and necessitate the modification of the "key," which is somewhat clumsy because of our ignorance of the character of the rostral, the size of the eye, the number of gasterosteges, etc., in *L. roseofusca*. The manifest great variability of the characters derived from the number and shape of scales and plates in these snakes makes it quite likely that some of the forms here recognized, in the future will be recognized only as varieties. The number of gasterosteges, on the other hand, seems to be rather constant, and the large size of the eye in *L. trivirgata*, as well as the prominence of the rostral in *L. orcutti*, are apparently also features of considerable diagnostic importance.

SCIENTIFIC RESULTS OF EXPLORATIONS BY THE U. S. FISH COMMISSION STEAMER ALBATROSS.

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No. I.—BIRDS COLLECTED ON THE GALAPAGOS ISLANDS IN 1888.

BY
ROBERT RIDGWAY,
Curator of the Department of Birds.

The collection of birds made by the Fish Commission Steamer *Albatross* having been placed by the Commissioner of Fisheries in my hands for identification and report, the following list of the species is herewith given, classified according to locality, and accompanied by such notes as seem necessary or desirable.

The collection was made by Prof. Leslie A. Lee, naturalist of the expedition, assisted by Mr. Charles H. Townsend and Mr. Thomas Lee, and would doubtless have been much more extensive had not other duties, more closely connected with the main objects of the cruise, prevented.

In compliance with instructions from Professor Baird, then Commissioner of Fisheries and Director of the National Museum, the writer prepared for the use of the naturalists of the *Albatross* memoranda of "suggestions as to what localities lying along or contiguous to the proposed route" of that vessel were "most worthy of special ornithological exploration," besides naming the more important and special desiderata; while Mr. Leonhard Stejneger, Assistant Curator of the Department of Birds, furnished memoranda of "suggestions for the exploration of the avifauna of the Galapagos Islands," which gave, besides recommendations regarding future explorations, a review of what had already been accomplished in that interesting group by previous explorers.

It is much to be regretted that so little attention was paid to the collecting of specimens of the *Procellariidæ*, for obtaining which unusual opportunities must have been afforded, since numerous species of this pelagic family of birds are involved in great confusion, and it is equally unfortunate that no notes accompany the specimens; but doubtless this apparent oversight was caused by want of necessary time, or other circumstances over which the naturalists of the expedition had no control.

The collection of birds from the Galapagos archipelago is of special interest for the reason that two islands are represented upon which no collections have previously been made, several new species being thus added not only to the archipelago, but to science, while other islands have been more carefully explored, thereby adding very materially to our knowledge of the remarkable endemic bird-fauna of these remote and highly interesting islands.*

The general character, relationships, and significance of the Galapagoan bird-fauna have been so thoroughly and ably discussed by Mr. Osbert Salvin, in his admirable monograph entitled "On the Avifauna of the Galapagos Archipelago" † that it would not be desirable to here enter into an elaborate discussion of the subject.

A complete list of the species collected on the Galapagos by the naturalists of the *Albatross* is given on the following pages, with such comments as seem necessary or desirable, and following this list is a tabular statement giving all the species which have been taken, to date, on or among these islands, and indicating those upon which each species has been found; also, a list of the species which have been taken on each island, together with other matter intended to further elucidate the subject, to properly understand which Mr. Salvin's very important monograph, before mentioned, should be at the same time consulted.

Family MIMIDÆ.

1. **Nesomimus**‡ **melanotis** (Gould).

James Island, eleven specimens; Chatham Island, five specimens; Indefatigable Island, three specimens.

Owing to the circumstance that none of the specimens are in perfect plumage, I am unable to ascertain whether there are any constant differences of coloration according to locality. Examples from James Island, however, appear to have longer, slenderer, and more curved bills than those from Indefatigable Island, which have the bill more as in *N. parvulus*. All the specimens from Chatham Island are, unfortunately, young birds.

2. **Nesomimus parvulus** (Gould).

Albemarle Island, three specimens.

Closely allied to *N. melanotis*, but readily distinguished by the distinctly ashy breast, even in the much worn plumage, when other ascribed characters fail. It is somewhat singular that this character has not before been mentioned. I am unable to distinguish the young in first plumage from that of *N. melanotis.* The specimen described by Mr. Sharpe in P. Z. S., 1877, p. 65, is undoubtedly a young bird, the adult having no spots on the breast.

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* The ground is classic ground, and the natural products of the Galapagos Islands will ever be appealed to by those occupied in investigating the complicated problems involved in the doctrine of the derivative origin of species. Osbert Salvin.

† On the Avifauna of the Galapagos Archipelago. By Osbert Salvin, M. A., F. R. S., etc. <Transactions of the Zoological Society of London, vol. IX, pt. IX, May, 1876, pp. 447–510, pls. 84–89, with a map of the archipelago.

‡ *Nesomimus*, gen. nov.

Char.—Similar to *Mimus* Boie, but bill longer and much more compressed basally, and tarsus much longer (nearly twice as long as middle toe instead of only about one-third longer).

Type, *Orpheus melanotis* Gould.

3. Nesomimus macdonaldi sp. nov.

SP. CHAR.—Similar to *N. trifasciatus* (Gould), but much grayer above, much more black on side of head, the bill much longer, and the tarsi much shorter.

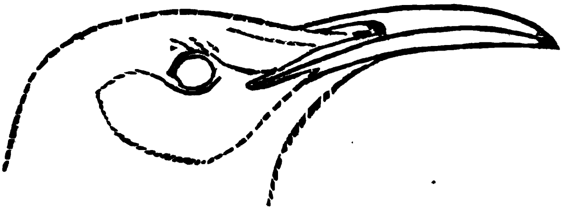

FIG. 1.—*Nesomimus macdonaldi.*

HAB.—Hood Island, Galapagos.

Adult male (type, No. 116066, Hood Island, Galapagos, April 7, 1888; U. S. S. *Albatross*): Above brownish gray, more ashy anteriorly and on lesser wing coverts, becoming decidedly brown on rump, each feather with a central or mesial space of dusky, these markings largest on back and scapulars, nearly obsolete on lower back and hind-neck; wings (except lesser coverts) dull black, the posterior row of lesser coverts, middle coverts, and greater coverts, broadly margined at tips with white, forming three bands across the wing; greater coverts and tertials broadly edged with drab or grayish brown, the latter margined terminally with white; primaries and their coverts narrowly edged with pale brownish gray or dull whitish; tail blackish dusky, the outer feather with an ill-defined pale brownish-gray space near tip of inner web, next to edge, the second with a mere edging of the same color in corresponding position. A narrow and poorly defined superciliary stripe of white, bordered beneath by a blackish stripe covering lores, extending beneath eye, and thence along upper edge of auricular region, the rest of the latter dull light gray mixed with black, especially on lower posterior portion; a broad white malar stripe, bordered beneath by a narrow interrupted stripe of dusky along each side of throat. Under parts white, tinged with pale drab across chest, where sparsely spotted with brownish dusky; upper part of breast immaculate, forming a rather distinct broad band or belt, this succeeded by broad lateral patches (nearly or quite meeting on middle of breast) where the feathers are faintly tinged with brownish-gray and marked with large central, more or less U-shaped spots of dusky; sides and flanks broadly streaked with dusky. Bill black, slightly brownish on basal portion of lower mandible; legs and feet brownish-black. Length (skin), 10.50; wing, 4.90; tail, 4.80; (middle feathers not grown out); exposed culmen, 1.25; bill to rictus, 1.60; tarsus, 1.50; middle toe, .90.

Adult female (No. 116004, Hood Island, Galapagos, April 7, 1888): Similar to the male described above, but slightly smalier, bill straighter, and under parts more tinged with brown, as well as more distinctly spotted across chest. Length (skin), 10.00; wing, 4.55; tail, 4.25; exposed culmen, 1.23; bill to rictus, 1.58; tarsus, 1.45.

Four additional adult males agree essentially in coloration with the one described, and measure as follows: Length (skin), 10.00–10.50; wing, 4.60–5.05; tail, 4.40–4.60; exposed culmen, 1.27–1.35; bill to rictus, 1.55–1.65; tarus, 1.50.

This fine new species is named after Col. Marshall McDonald, U. S. Commissioner of Fisheries.

4. Nesomimus personatus sp. nov.

SP. CHAR.—Similar to *N. melanotis* (Gould), but much larger and darker, with sides and flanks more tinged with brown.

HAB.—Abingdon Island, Galapagos.

Adult male (type, No. 116098, Abingdon Island, Galapagos, April 16, 1888; U. S. S. *Albatross*): Pileum, hind-neck, back, scapulars, wings, and tail* dull blackish, the feathers indistinctly margined or edged with dull grayish brown, these edgings much wider and more distinct on wing and tail feathers; feathers of hind-neck ash-gray beneath the surface; lower back, rump, and upper tail-coverts dull grayish brown, the feathers darker centrally, forming indistinct streaks; middle and greater wing-coverts broadly tipped with dull white, forming two distinct bands across wing; remiges rather broadly margined at tips with dull light brownish gray (more brownish on tertials); three outer tail-feathers broadly tipped with pale grayish brown (fading into dull white exteriorly), this color confined to the inner web on third feather; fourth feather with a more restricted and less definite lighter terminal space, and two middle pairs merely fading at tips into dull grayish brown edged with dull whitish. A superciliary stripe of dull grayish white, narrower, whiter, and more sharply defined over lores; lores, suborbital region, and auriculars dull black, forming a conspicuous patch along side of head; malar region, sides of neck, and lower parts white, the first speckled with dusky, the second spotted with same posteriorly, and the latter tinged with light brownish, except on chin and throat, the sides and flanks very distinctly washed or suffused with brown, the latter broadly streaked or striped with dusky. Bill black, inclining to horn-color at tip of upper and base of lower mandible; legs and feet brownish black. Length (skin), 9.30; wing, 4.50; tail, 4.15; exposed culmen, 1.00; bill from rictus, 1.35; tarsus, 1.43; middle toe, .87.

Adult female (No. 116099, same locality, etc.): Essentially like the male in coloration,* but smaller. Length (skin), 9.00; wing, 4.10; tail, (feathers much worn), 3.90; exposed culmen, 1.07; bill from rictus, 1.40; tarsus, 1.35; middle toe, .80.

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* The specimen was molting when shot, though the new plumage had been mostly assumed; consequently, in this description, the duller, faded, coloration of the old feathers is ignored.

Six additional adult males agree in all essential characters with the type.

Family MNIOTILTIDÆ.

5. Dendroica aureola (GOULD).

Indefatigable Island, one specimen; Charles Island, four specimens; James Island, two specimens; Chatham Island, four specimens.

Family HIRUNDINIDÆ.

6. Progne concolor (GOULD).

Indefatigable Island (Eden Rock); one adult female.

Family CŒREBIDÆ.

7. Certhidea olivacea GOULD.

Chatham Island, two specimens; James Island, two specimens.

8. Certhidea fusca SCL. and SALV.

Abingdon Island, six specimens.

9. Certhidea cinerascens sp. nov.

SP. CHAR.—Similar to *C. fusca*, Scl. and Salv., but much less olivaceous above, whiter beneath, and bill smaller.

HAB.—Hood Island, Galapagos.

Adult male (type No. 116069, Hood Island, Galapagos, April 7, 1888; U. S. S. *Albatross*): Above plain dull brownish gray, beneath wholly dull grayish white, faintly tinged with buffy, especially along sides. Bill black, basal half of lower mandible horn-color; legs and feet deep black. Length (skin), 3.85; wing, 2.00; tail, 1.40; exposed culmen, .37; bill from rictus, .45; tarsus, .73; middle toe, .43.

Family FRINGILLIDÆ.

10. Geospiza strenua GOULD.

Abingdon Island, two specimens; Charles Island, one specimen.

The specimen from Charles Island is a male (in variegated plumage), and is quite undistinguishable from examples from Abingdon Island.

I am not satisfied as to the propriety of considering the specimens from Bindloe Island referred by Mr. Salvin to this species as really the same form, but believe that they represent a local race, all of the three examples in the U. S. National Museum collection having the bill decidedly broader and relatively shorter, as well as lighter colored. I have not seen specimens from James or Chatham Islands, the original localities.

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* The plumage is in such bad condition, however, that a satisfactory comparison is impossible.

11. Geospiza conirostris sp. nov.

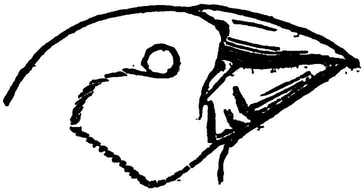

FIG. 2.—*Geospiza conirostris.*

SP. CHAR.—Similar to *G. strenua* Gould, but bill much more elongated, much narrower, and culmen less arched.

HAB.—Hood Island, Galapagos.

Adult male (type, No. 116070, Hood Island, Galapagos, April 7, 1888; U. S. S. *Albatross*): Uniform black, the longer under-tail coverts margined (rather broadly) with white; bill, legs, and feet wholly black. Length (skin), 5.70; wing, 3.30; tail, 2.10; culmen, .95; gonys, .52; width of lower mandible at base, .51; depth of bill at base, .70; tarsus, .95; middle toe, .72.

Adult female (No. 116076, same locality, etc.): Much duller black than the male, or dull slate-dusky, broken on the belly, flanks, etc., by dull whitish streaks (edgings to feathers); all the under tail-coverts margined with dull whitish; under mandible dull brownish in middle portion; legs and feet dull black. Length (skin), 5.50; wing, 3.10 (quills worn at tip); tail, 1.75 (feathers very much worn at tip); culmen, .90; gonys, .50; width of under mandible at base, .48; depth of bill at base, .62; tarsus, .95; middle toe, .68.

Immature (?) *male* (No. 116075, same locality, etc.): Similar to the adult female as described above, but rather more sooty, and lower mandible pale brownish, with base and tip dusky. Length (skin), 5.75; wing, 3.15; tail, 2.00; culmen, .90; gonys, .50; width of under mandible at base, .48; depth of bill at base, .68; tarsus, .93; middle toe, .70.

Immature (?) *female* (No. 116077, same locality, etc.): Above dull sooty; anterior lower parts similar, but indistinctly streaked with pale grayish buffy, this gradually increasing posteriorly until it becomes the prevailing color and the sooty reduced to broad streaks. Length (skin), 5.70; wing, 3.10; tail, 2.00; culmen, .89; gonys, .50; width of lower mandible at base, .47; depth of bill at base, .62; tarsus, .92; middle toe, .67. Bill intermediate in color between that of adult female and immature male described above.

The additional adults (two of them males, the third with sex not determined) agree minutely in form and size of bill and other measurements with the adult specimens described, one of the males being like the type in coloration while the other corresponds in plumage with the adult female described.

12. **Geospiza media**, sp. nov.

SP. CHAR.—Similar to *G. conirostris*, but slightly smaller, with bill much smaller and less elongated.

HAB.—Hood Island, Galapagos.

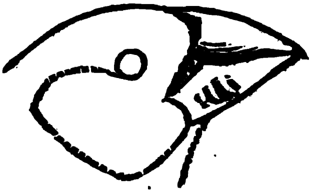

FIG. 3.—*Geospiza media.*

Adult male (type, No. 116072, Hood Island, Galapagos, April 7, 1888; U. S. S. *Albatross*): Uniform dull black, the under tail-coverts broadly margined with buffy white; bill, legs, and feet wholly black. Length (skin), 5.50; wing, 3.10; tail, 2.10; culmen, .80; gonys, .42; width of lower mandible at base, .45; depth of bill at base, .62; tarsus, .90; middle toe, .65.

While loath to describe a new species from a single specimen, I am forced to do so for the reason that it can not be made to fit in with any of the recognized species represented by specimens now before me. It has the bill shaped exactly as in *G. fortis* (represented by 37 specimens, from seven islands), but the bird is in every way much larger.

13. **Geospiza fortis** GOULD.

Charles Island, two specimens; Chatham Island, six specimens; Indefatigable Island, two specimens; Abingdon Island, nine specimens; James Island, six specimens; Albemarle Island, four specimens.

The specimens from Albemarle Island appear to be clearly referable to this species, and agree most closely in form and size of the bill with those from James, Charles, Indefatigable, Abingdon, and Bindloe Islands; those from Chatham Island have the bill decidedly larger, and should be separated as a local race.

14. **Geospiza fuliginosa** GOULD.

Chatham Island, eight specimens; James Island, two specimens; Indefatigable Island, two specimens; Duncan Island, ten specimens; Charles Island, one specimen; Hood Island, one specimen; Albemarle Island, three specimens; Abingdon Island, one specimen.

15. **Geospiza parvula** GOULD.

Abingdon Island. seven specimens.

16. **Geospiza difficilis** SHARPE.

Geospiza difficilis SHARPE, Cat. B. Brit. Mus., XII, 1888, 12 (Abingdon and Charles Islands).

Abingdon Island, one specimen.

17. Cactornis scandens GOULD.

Charles Island, four specimens; Indefatigable Island, six specimens.

18. Cactornis abingdoni SALV.

Abingdon Island, four specimens.

I am very doubtful whether the distinctness of this bird from *C. scandens* can be maintained. The two adult males have the same uniform black plumage as those of *C. scandens*, while of the five adult males of the latter (three from Indefatigable and two from Charles Islands), three have the bill entirely black, the other two having merely a blotch of paler color on the under side of the lower mandible (barely perceptible in one of them). The specimens from Abingdon Island have the bill slightly larger than those from the other islands above mentioned, but the difference in this respect between them and the specimens from Indefatigable Island is not greater than between the latter and those from Charles Island. In short, if the uniform black specimens from Charles and Indefatigable Islands are true *C. scandens*, I should unhesitatingly consider *C. abingdoni* a synonym of that species. The U. S. National Museum does not, however, possess a specimen from James Island, the original locality of *C. scandens*, and I am therefore unable to form a more definite opinion on the subject.

19. Cactornis brevirostris sp. nov.

SP. CHAR.—Similar to *C. scandens* in color, but bill very different in form, being much shorter and deeper, and with decidedly arched culmen.

HAB.—Chatham Island.

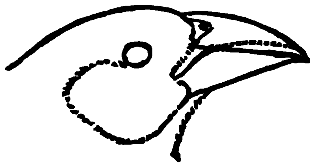

FIG. 4.—*Cactornis brevirostris.*

Immature male (type, No. 115920, Charles Island, Galapagos, April 8, 1888; U. S. S. *Albatross*): Dull sooty blackish, uniform on head, neck, and chest, elsewhere broken by lighter margins to feathers; these edgings dull light grayish brown on upper parts, dull brownish white on lower parts; sides and flanks washed with pale brown; under tail-coverts dull buffy white, with concealed mesial streaks of dusky. Bill entirely black; tarsi deep brown; toes brownish black. Length (skin), 4.50; wing, 2.70; tail, 1.85; culmen, .70; gonys, .40; width of lower mandible at base, .37; depth of bill at base, .45; tarsus, .82; middle toe, .62.

The form of the bill in this species is very nearly intermediate between that of *Cactornis* and *Geospiza*, though decidedly more like the former.

20. Cactornis pallida SCL. and SALV.? (*C. hypoleuca*, sp. nov., if distinct.*)

A single specimen from James Island seems to come very near to *C. pallida* Scl. and Salv., but it is apparently larger and lighter colored, *C. pallida* being described as having the upper parts olive-brown and the lower parts pale ochraceous, whereas the bird in hand is light grayish olive above and dull white beneath. M. Sharpe, however, in describing the type specimen says (Cat. B. Brit. Mus., XII, p. 20) that it is "pale olive-brown" above and the "cheeks, throat, and under surface of body white, slightly washed with olive-yellow, with a few dusky streaks on the chest," which very nearly agrees with the James Island specimen. The difference in measurements is shown below:

	Total length.	Wing.	Tail.	Culmen.	Tarsus.
C. pallida	4.70–5.00	2.70–2.83	1.70	.65–.70	.85–.90
James Island specimen	5.70	8.00	1.90	.70	.90

21. Camarhynchus psittaculus GOULD?

Indefatigable Island, one specimen; James Island, one specimen, an adult male, very doubtfully referred to this species. Its characters are as follows:

Adult male (No. 116006, James Island, Galapagos, April 11, 1888; U. S. S. *Albatross*): Head, neck, and chest uniform sooty blackish; rest of upper parts dull grayish olive, darker anteriorly, where gradually blending into blackish of hind-neck, paler and more olivaceous on rump and upper tail-coverts; wings and tail dull grayish brown or dusky, the feathers edged with paler grayish brown; under surface of body (except chest) dull buffy white, the breast mixed with blackish and sides indistinctly streaked with the same; under tail-coverts pale dull buffy. Bill black, more brownish on gonys; legs and feet dark brown. Length (skin), 5.25; wing, 3.00; tail, 1.90; culmen, .62; gonys, .32; bill from rictus, .55; depth at base, .47.

The specimen from Indefatigable Island is a male in light colored (immature?) plumage, something like the example described and figured in the Zoölogy of the Beagle, but has the bill much darker, the upper parts grayer, and lower parts whiter. Length (skin) 5.30; wing, 2.90; tail, 1.90; culmen, .57; gonys, .28; bill from rictus, .50; depth at base,

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* *Adult* (?) *male* (No. 115997, James Island, Galapagos, April 11, 1888; U. S. S. *Albatross*): Above plain light grayish olive, the pileum very indistinctly streaked with darker; wings dusky, with pale grayish olive edgings, the middle and greater coverts edged more broadly with dull buffy. A superciliary stripe (becoming obsolete above auriculars), suborbital and malar regions, and entire lower parts dull white tinged with pale buffy on under parts of the body, the under tail-coverts more decidedly so; sides of chest very indistinctly streaked with pale grayish. Bill pale yellowish brown (the lower mandible lighter and more yellowish), darker at tip; legs and feet blackish brown. Length (skin), 5.70; wing, 3.00; tail, 1.90; culmen, .70; gonys, .38; bill to rictus, .70; depth at base, .40; tarsus, .90; middle toe, .68.

.45. It will be observed that while these two specimens agree closely in measurements they are decidedly larger than *C. psittaculus*, as described by Messrs. Gould and Salvin.

22. Camarhynchus crassirostris Gould.

Charles Island, two specimens; Indefatigable Island, two specimens; Chatham Island, one specimen.

In attempting to identify this species I am much puzzled by important discrepancies in the descriptions given by Messrs. Gould, Salvin, and Sharpe, all of which purport to be taken from the type specimen. Thus, Gould says of the under parts: "The throat and breast cinereous olive, with the middle of each feather darker; the abdomen, sides, and under tail-coverts cinereous tinged with straw color." Mr. Salvin's description of the same parts, translated, reads as follows: "Beneath whitish, each feather of the throat and upper breast black in the middle." Then comes Mr. Sharpe, who says that the species "differs from *C. variegatus* in its *uniform under surface** not being mottled with brown streaks." The measurements given by these three authors vary no less remarkably, as the following will show:

	Total length.	Wing.	Tail.	Bill.	Tarsus.	Remarks.
Gould	5.50	3.75	2.00	.50	1.13	(Tarsus, 1⅛; height of bill, ½.
Salvin	5.20	3.00	1.90	to rictus 0.50	0.85	
Sharpe	5.30	3.05	1.90	culmen 0.60	0.90	
Albatross specimens	5.50–5.60	3.40–3.50	2.40	to rictus 0.60–0.65	1.08–1.12	Tail measured to extreme base.

Our specimens from Charles Island agree best as to coloration with Mr. Salvin's description, though they resemble fairly the colored figure in the Zoölogy of the Beagle (pl. 41); as to measurements, they correspond best with those given by Gould.

23. Camarhynchus prosthemelas Scl. and Salv.

Chatham Island, two specimens; Charles Island, two specimens; James Island, four specimens.

24. Camaryhnchus habeli Scl. and Salv.

Abingdon Island, two specimens.

25. Camarhynchus townsendi, sp. nov.

Sp. Char.—Similar to *C. psittaculus*, but paler and with a differently shaped bill, the culmen broader and less arched, and commissure straighter.

Hab.—Charles Island.

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* Not italicized in original.

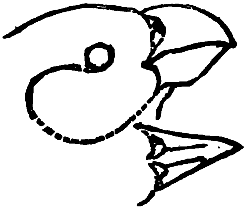

FIG. 5.—*Camarhynchus townsendi.*

Adult (?) *male* (No. 115915, Charles Island, Galapagos, April 8, 1888; U. S. S. *Albatross*): Above light brownish-gray, decidedly tinged with olive on hinder scapulars, lower back, and rump; middle and greater wing-coverts broadly but not very distinctly tipped with pale dull buffy; superciliary stripe and entire under parts dull buffy whitish, the breast and sides tinged with brownish gray, the sides of the former showing very indistinct broad streaks of the same; under wing-coverts and broad margins to inner webs of remiges nearly pure white. Upper mandible dark brown, lower mandible paler; legs and feet dark brown. Length (skin), 4.50; wing, 2.80; tail, 1.85; culmen, .58; gonys, .31; bill from rictus, .51; depth at base, .45; tarsus, .88; middle toe, .60.

Adult (?) *female* (No. 115914, same locality, etc.): Similar to the male as described above, but very slightly whiter beneath. Length (skin), 4.70; wing, 2.90; tail, 1.80; culmen, .55; gonys, .29; bill from rictus, .50; tarsus, .90; middle toe, .65.

It is not unlikely that the full-plumaged male of this species has the head and neck blackish, like *C. habeli* and the supposed *C. psittaculus* described above.

I see no other way to dispose of these specimens from Charles Island than to describe them as a distinct species. Viewed laterally, the bill is shaped much like that of *C. habeli*, except that it is shorter; viewed vertically, it is seen to be less compressed, especially on the culmen, which does not present a well defined ridge as seen in *C. habeli.*

This new species is named for Mr. Charles H. Townsend, one of the naturalists of the *Albatross*, and an accomplished ornithologist.

26. Camarhynchus pauper sp. nov.

SP. CHAR.—Similar to *C. townsendi* but slightly smaller, with the bill very much smaller and with straighter culmen, the legs and feet much more slender, and the under parts more tinged with buffy.

HAB.—Charles Island.

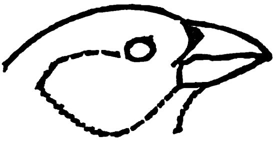

FIG. 6.—*Camarhynchus pauper.*

Adult (?) *female* (type, No. 115913, Charles Island, Galapagos, April 8, 1888; U. S. S. *Albatross*): Above grayish olive, the feathers of the head and back slightly darker centrally, the olive color paler on the rump; wings and tail dull grayish dusky with lighter olive-grayish edgings, these dull buffy on middle and greater wing-coverts; supraloral space and malar region pale dull grayish buffy; chin and throat similar but paler and more grayish; rest of under parts pale buffy fading into nearly white on belly; sides and flanks tinged with grayish olive, and chest very faintly flammulated with the same. Bill wholly grayish black; legs and feet dusky brown. Length (skin), 4.60; wing, 2.70; tail, 1.65; culmen, .50; gonys, .30; bill from rictus, .50; depth at base, .35; tarsus, .85; middle toe, .58.

Family TYRANNIDÆ.

27. Pyrocephalus nanus Gould.

Indefatigable Island, one specimen; James Island, five specimens; Charles Island, six specimens; Chatham Island, two specimens; Abingdon Island, two specimens.

There are some very marked differences of coloration and measurements between specimens from different islands, which will probably necessitate the recognition of several forms; but most of the skins I have for examination are either in very worn or molting plumage, so that a satisfactory comparison is out of the question.

The two examples from Chatham Island, both adult males, are much the smallest, the wing measuring only 2.30, the tail 2.00, the exposed culmen .40, and the tarsus .65, while those from other islands measure, wing 2.50–2.65, tail 2.15–2.25, exposed culmen .45–.50, and tarsus .65–.75 (averaging more than .70). As to color, they are of a lighter brown above, and paler red beneath, although the crest is as intensely colored as in other specimens.

The two adult males from Abingdon Island differ conspicuously from all the others, those from James Island included, in the hue of the red, which on the under parts is of a decided orange cast, or intermediate between orange-chrome and flame-scarlet,* while on others the hue is a rich vermilion.

The adult female from James Island has the under parts, except chin and throat, which are white, clear naples yellow, deepest on the belly, the breast very narrowly and indistinctly streaked with grayish brown, while in the two from Charles Island the under parts are buff-yellow, a female from Indefatigable Island being very similar. These females (from last two localities) agree very well in color with the figure in the Zoölogy of the Beagle (plate 7), although the description in that work says the under parts of the female are "pale buff."

The locality from which the types of *P. nanus* were obtained is unfortunately not known, and I am not able to ascertain from descriptions whether the ordinary or most widely distributed larger form or the diminutive Chatham Island race are to be considered the same as true *P. nanus*. It is probable, however, that the larger form may be properly considered to be *P. nanus*, and if this proves to be correct, I would propose for the Chatham Island bird the provisional name of *Pyrocephalus minimus*.

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* Of my "Nomenclature of Colors."

28. **Myiarchus magnirostris** (GRAY).

Chatham Island, two specimens; James Island, five specimens; Indefatigable Island, one specimen; Abingdon Island, two specimens; Duncan Island, four specimens; Hood Island, two specimens; Charles Island, four specimens.

There are apparently some differences between specimens from different islands, but most of the skins being in poor plumage, I am not able to make a satisfactory comparison. The single adult from Abingdon Island, for example, has scarcely a trace of rufous on the inner webs of the tail feathers (very decided in all the others), the inner webs of these feathers being pale broccoli-brown, becoming dark hair-brown next the shaft.

Family CUCULIDÆ.

29. **Coccyzus melanocoryphus** VIEILL.

Chatham Island, one specimen; Charles Island, one specimen.

These specimens, both adults, I am unable to distinguish from mainland examples, though that from Charles Island has the bill considerably deeper, and broader at the base, than any I have seen.

Family BUTEONIDÆ.

30. **Buteo galapagoensis** (GOULD).

Indefatigable Island, two specimens; Abingdon Island, one specimen.

This bird is so closely related to *B. swainsoni* that there can be little doubt that it is merely a local form of that species, slightly differentiated by long isolation from the parent stock. It differs chiefly, if not entirely, in its heavier bill and feet.

Family PELECANIDÆ.

31. **Pelecanus californicus** RIDGW.

Pelecanus fuscus SUNDEV. P. Z. S., 1871, 125.—SALV. Trans. Zool. Soc. Lond., IX, pt. IX, 1876, 496.

Pelecanus californicus RIDGW. Water B. N. Am., II, Aug., 1884, 143.

Chatham Island, two specimens; also one specimen without label.

The single adult example (No. 115964) is in the white-necked or postnuptial plumage, and agrees exactly with Californian specimens, except that the lower parts are darker and more distinctly streaked with white, each feather having a very distinct though narrow mesial streak of this color. The pouch, in the dried skin, is light brown basally, and the bill is chiefly orange-reddish, the sides of the under mandible with only a slight blackish mottling toward the base.

No. 115965 is apparently a female, and is in transition immature plumage, the brownish chestnut of the neck being interspersed with white feathers.

The third example (No. 116297) is a young bird, probably a male, of the preceding year, and agrees exactly with a specimen from California. In this the sides of the under mandible are mainly blackish, becoming orange-reddish terminally and whitish basally; the pouch light brownish basally, as in the preceding.

The measurements of these specimens are as follows:

Catalogue number.	Locality.	Wing.	Tail.	Culmen.	Tarsus.	Middle toe.
115964	Chatham Island	22.75	7.80	14.00	3.30	4.50
115965	do	21.25	6.00	12.25	3.15	4.05
116297		22.00	6.25	14.00	3.35	4.25

Family SULIDÆ.

32. **Sula gossi** Ridgw.

? *Sula cyanops* Salv. Trans. Zool. Soc. London, IX, pt. IX, 1876, 496.
? *Dysporus cyanops* Sundev. P. Z. S., 1871, 125.

Chatham Island, one specimen. This example I am unable to distinguish from the types of *S. gossi*. Its measurements are as follows: Wing, 17.50; tail, 10.00 (graduated for 4.70); culmen, 4.55; depth of bill at base, 1.37; tarsus, 2.30; middle toe, 3.05.

Family ARDEIDÆ.

33. **Ardea herodias** (Linn.) ?

Duncan Island, one specimen.

I am not quite satisfied of the absolute identity of this bird with the true *A. herodias*, but the single specimen in the collection being not fully adult a satisfactory comparison can not be made.

34. **Butorides plumbeus** (Sundev.).

Hood Island, three specimens; James Island, two specimens; Duncan Island, one specimen; Abingdon Island, one specimen.

There is much variation in intensity of coloration among the adults in this series, but since the two specimens from James Island represent nearly the extremes, it is probable that the variation is of an individual character.

35. **Nycticorax pauper** Scl. and Salv.

Hood Island and Indefatigable Island; two specimens.

Family PHŒNICOPTERIDÆ.

36. **Phœnicopterus ruber** Linn.

James Island, two specimens; Charles Island, four specimens.

After very careful comparison, I am unable to find any constant difference between these birds and examples of *P. ruber* from Florida, Yucatan, and the Bahamas. The series of the latter available for comparison is, however, very meager. A very young bird may be described as follows:

Downy young: Grayish white, becoming nearly pure white on forehead, cheeks, median line of back, whole rump, and median under parts; bill pale brownish, dusky terminally; naked lores dusky; legs and feet brownish black. *Bill nearly straight.*

Family ANATIDÆ.

37. Pœcilonetta galapagensis sp. nov.

Pœcilonitta bahamensis GOULD and DARWIN, Zool. Beag., III, 1841, 135.
Anas bahamensis SUND., P. Z. S., 1871, 126.
Dafila bahamensis SCL. and SALV., Trans. Zool. Soc. Lond., IX, pt. IX, 1876, 499.

SP. CHAR.—Similar to *P. bahamensis* (Linn.), but white on sides of head thickly speckled with brown instead of being quite immaculate, and top of head grayer brown.

Adult male (type, No. 115931, Charles Island, Galapagos, April 8, 1888; U. S. S. *Albatross*): Pileum, sides of head down to below the eyes, and hind-neck, pale sepia-brown or hair-brown, speckled with dusky, these markings larger on pileum; back and anterior scapulars dusky grayish brown, the feathers with paler grayish brown margins; lower back and rump plain dusky grayish brown; posterior scapulars dusky grayish brown, margined with dull buffy; wing-coverts plain brownish slate, the greater sharply tipped with deep cinnamon-buff; secondaries metallic green, washed with copper-bronze, crossed about midway of the exposed portion by a narrow band (about .12–.15 wide) of velvety black, the succeeding portion deep cinnamon-buff; tertials broadly edged with paler cinnamon-buff; primaries dusky brownish slate. Upper tail-coverts and tail pale pinkish buff (middle tail-feathers nearly white), the concealed portions of the feathers more grayish. Chin, throat, and fore-neck immaculate white, this separated from the brown of sides of head and neck by a speckled space about .40 of an inch wide; rest of under parts pale brown (intermediate between fawn-color and isabella-color), thickly spotted with dusky, the flanks pale fawn-color, with larger spots, and the under tail-coverts plain pale fawn-color, the longer ones with dusky mesial streaks; axillars white, the terminal portion, mesially, mottled with dusky; under wing-coverts plain brownish slate, the last row white. Bill blackish, with a large space on lower basal portion of upper mandible reddish; legs and feet dusky brownish. Length (skin), 16.75; wing, 8.10; tail, 3.70; culmen, 1.78; greatest width of bill, 72; tarsus, 1.48; middle toe, 1.62.

Adult female (No. 116143, same locality, etc.). Similar to the male but smaller, lower fore-neck speckled with dusky brown, tail-coverts spotted with dusky, and reddish space at lower base of upper mandible much smaller. Length (skin), 16.00; wing (quills molting); tail, 3.15; culmen, 1.60; greatest width of bill, .65; tarsus, 1.42; middle toe, 1.55.

Specimens of *P. bahamensis* with which the above examples have been compared, and from all of which they differ in the characters mentioned in the diagnosis, are from the West Indies (Bahamas, 1; Guadeloupe, 3; Barbuda, 1); Buenos Ayres, 1; and Chili, 2.

Family COLUMBIDÆ.

38. **Zenaida galapagoensis** GOULD.

Indefatigable Island, four specimens; Duncan Island, two specimens; James Island, five specimens; Hood Island, four specimens.

Family HÆMATOPODIDÆ.

39. **Hæmatopus galapagensis** RIDGW.

? *Hæmatopus palliatus* SCL. and SALV. P. Z. S., 1870, 323 (Indefatigable Island).—SUNDEV. P. Z. S., 1871, 125.—SALV. Trans. Zool. Soc., IX, pt. IX, 1876, 502 (do.). *Hæmatopus galapagensis* RIDGW. Auk, III, July, 1886, 331 (Chatham Island); Proc. U. S. Nat. Mus., IX, Oct. 19, 1886, 325.

James Island, one specimen.

Family ARENARIIDÆ.

40. **Arenaria interpres** (LINN.).

Hood Island, one specimen.

Family RECURVIROSTRIDÆ.

41. **Himantopus mexicanus** (MÜLL.) ?

James Island, two specimens in immature plumage.

Family SCOLOPACIDÆ.

42. **Heteractitis incanus** (GM.).

Hood and James Islands, two specimens.

Family LARIDÆ.

43. **Anous stolidus** (LINN.).

Chatham Island (Dalrymple Rock), one specimen.

44. **Anous galapagensis** SHARPE.

Anous galapagensis SHARPE. Philos. Trans., CLXVIII, 1879, 469.

Hood and Chatham Islands, two specimens. (Certainly distinct from *A. stolidus.*)

45. **Larus fuliginosus** GOULD.

Indefatigable Island, two specimens; James Island, one specimen; Chatham Island, one specimen.

46. Creagrus furcatus (Nèb.).

Chatham Island (Dalrymple Rock), two specimens (adult male and female in perfect summer plumage).

This fine species, from its great rarity and the uncertain history of the type specimen, is worthy of somewhat extended discussion. Although a special genus, *Creagrus*, was instituted for it by Bonaparte, it has by most recent writers been referred to the genus *Xema*, Leach; but this is a view of its affinities in which I can not concur, since, beyond a similarity in the color of the bill and to a less extent in that of the plumage and in the shape of the tail, I see no particular resemblance. In fact, *Creagrus* seems to me to be one of the best, if not the very best, characterized of all the genera or subgenera of *Larinæ*, excepting only *Gavia*, *Rissa*, and *Rhodostethia.*

From *Xema*, the points of difference are many and decided. The bill is very peculiar in shape, being much deeper at the base than elsewhere and strongly decurved at the tip; that of *Xema* being much smaller proportionally, much straighter, and much deeper through the angle than at the base. The tail is relatively much longer and much more deeply forked, being nearly half as long as the wing and forked for about one-third of its length, while that of *Xema* is much less than half as long as the wing and forked for not more than one-eighth of its length. As to coloration, there is even greater difference, *Creagrus* having the dark "hood" descending much farther down over the neck, and instead of being very abruptly terminated by a black border has no very definite outline except on the fore neck; while the white patch at the base of the upper mandible and the very conspicuous white stripe margining the exterior scapulars are entirely peculiar features. Moreover, the plumage of the young is quite distinct in its character from that of *Xema.*

Compared with *Xema sabinii*, *Creagrus furcatus* is a large gull, about the size of *Larus delawarensis*, while the former is hardly so large as *L. philadelphia*, and with its dark colored head, deep red feet, and deeply forked tail ought to be very easily identified at a considerable distance.

The perfect summer plumage of the adult may be described as follows:

Adult male, breeding plumage (No. 115967, Dalrymple Rock, Chatham Island, Galapagos, April 6, 1888; U. S. S. *Albatross*): A white patch at base of upper mandible, crossing anterior portion of forehead, and averaging about .35 of an inch in width;* a very small white spot on the apex of the malar region; rest of head, with upper half of neck uniform slate-color,† this rather abruptly terminated on the fore-neck, but posteriorly fading gradually into the lighter gray of the hind neck;

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* This white patch does not extend as far down as the edge of the mandible.

† Corresponding to the slate-color (No. 4, plate II,) of my "Nomenclature of Colors," but slightly browner.

lower neck, all round, pale gray,* below extending over the sides of the breast, and fading gradually into the pure white of the middle of the breast and other under parts, but above gradually deepening into the uniform medium gray† which covers the back, scapulars, wing-coverts (except the lower greater and those along the margin of the wing), tertials, and rump; upper tail-coverts and tail entirely pure white, this abruptly contrasted with the deep gray of the rump. Exterior scapulars broadly and abruptly margined with pure white, forming a continuous and conspicuous narrow stripe along each side of the dorsal region; marginal wing-coverts, alulæ, lower greater coverts and upper secondaries, pure white; lower secondaries with outer webs very pale gray; four innermost primaries very pale gray, narrowly margined with white; sixth similar, but with a blackish blotch near the tip, extending quite across the inner web and for some distance along its edge; fifth quill mostly pale gray, with dusky shaft, the terminal portion (for about 1.30 inches along the shaft, black, this color much more extensive, however, along both edges), but with a small white apical spot; fourth quill with black much more extensive (extending nearly 5 inches from tip on outer web or 1.75 to nearest point on the inner), with still smaller white apical spot, the rest of the inner web white, becoming gray next to the shaft; third quill with black extending about 6.80 from the tip, or almost to the coverts on outer web, and 2.00 to nearest point on the inner, the white portion separated from the shaft by a dusky stripe; second quill similar but with the whole exposed portion of outer web black, but the black on inner web a little more restricted; first quill similar, but black near tip of inner web more restricted, though the stripe along the shaft is broader. (The three outermost quills have the white apical spots reduced to minute specks, which would entirely disappear with a very slight wearing of the feathers.) Bill, black, with a little less than the terminal third (or for about .70 of an inch from the tip) yellowish horn-white or pale olive-buff; rictus and broad, tumid eyelids, orange-red; iris, carmine; legs and feet, deep red; claws, deep black. Length (mounted specimen), about 20.00; wing, 16.25; tail, 7.40 (forked for 2.50); exposed culmen, 1.90; depth of bill at angle, .50; at base of culmen, .68; tarsus, 2.00; middle toe, 1.80.

Adult female in breeding plumage (No. 115968, same locality, etc.): Similar to the male, but with the slate-colored "hood" even less distinctly defined (approaching abrupt definition only on the fore neck), and white patch at base of upper mandible more restricted (averaging not more than .25 wide), the white spot on the malar apex also smaller (almost obsolete on one side). Length (mounted specimen), about 18.00; wing, 15.75; tail, 7.60; (forked for 2.60); exposed culmen, 1.90; depth of bill at angle, .47; at base of culmen, .65; tarsus, 1.98; middle toe, 1.70.

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* Varying from tints 8–9, plate II, of my "Nomenclature of Colors."

† Much like tint 7, plate II, of my "Nomenclature of Colors."

Family SPHENISCIDÆ.

47. Spheniscus mendiculus Sundev.

Albemarle Island, one specimen.

The following list of species includes all that have hitherto been found in the Galapagos Archipelago, and shows upon which islands each has been taken. Genera and species printed in italics occur elsewhere than in the Galapagos, all the others being, so far as known, peculiar to those islands. The * in the spaces representing different islands indicates that the species was credited to those islands in Mr. Salvin's monograph. The letter S indicates an additional locality on the authority of Mr. R. Bowdler Sharpe (Cat. B. Brit. Mus., vol. XII, 1888, pp. 6–20); the J indicates that the species was obtained by Dr. William H. Jones, U. S. N., as verified by specimens in the U. S. National Museum, while the × represents *additional* localities resulting from the *Albatross* exploration:

	Chatham Island.	Charles Island.	Indefatigable Island.	James Island.	Bindloe Island.	Abingdon Island.	Albemarle Island.	Duncan Island.	Hood Island.	Tower Island.	Barrington Island.	Narborough Island.	Jervis Island.
1. **Nesomimus:**													
1. **trifasciatus (Gould)**		*											
2. **melanotis (Gould)**	*	*	*	*									
3. **parvulus (Gould)**							*						
4. **macdonaldi Ridgw**									×				
5. **personatus Ridgw**						×							
2. **Dendroica:**													
6. **aureola (Gould)**	*	*	*	*	*	*							
3. **Progne:**													
7. **concolor (Gould)**		*	×	*									
4. **Certhidea:**													
8. **olivacea Gould**	*		*	*									
9. **fusca Scl. and Salv**					*	*							
10. **cinerascens Ridgw**									×				
5. **Geospiza:**													
11. **magnirostris Gould**	*	*											
12. **strenua Gould**	*	×	*	*	*	*							
13. **dubia Gould**	*												
14. **conirostris Ridgw**									×				
15. **media Ridgw**									×				
16. **fortis Gould**	*	*	*	*	*	*	×						
17. **nebulosa Gould**	*	*											
18. **fuliginosa Gould**	*	×	*	*		×	×	×	×				
19. **parvula Gould**	*			*	*	*							
20. **dentirostris Gould**	S?	S											
21. **difficilis Sharpe**		S				×							
6. **Cactornis:**													
22. **scandens Gould**		*	*	*	S								
23. **assimilis Gould**					*								
24. **abingdoni Salv**						*							
25. **brevirostris Ridgw**	×												
26. **pallida Scl. and Salv**			*	×?									
7. **Camarhynchus:**													
27. **psittaculus Gould**			*	*									
28. **crassirostris Gould**		*? ×	×										
29. **variegatus Scl. and Salv**					*	*							
30. **prosthemelas Scl. and Salv**	*	*	*	*									
31. **habeli Scl. and Salv**					*	*	(1)						
32. **townsendi Ridgw**		×											
33. **pauper Ridgw**		×											

[1] Seen on Albemarle Island by Dr. Habel.

	Chatham Island.	Charles Island.	Indefatigable Island.	James Island.	Bindloe Island.	Abingdon Island.	Albemarle Island.	Duncan Island.	Hood Island.	Tower Island.	Barrington Island.	Narborough Island.	Jervis Island.
8. Dolichonyx:													
34. oryzivorus (Linn.)	...	...	...	*	...	...	...	...	...	...	..	...	...
9. Pyrocephalus:													
35. nanus Gould	× ?	×	*	*	*	×	...	...	...	...	...	...	...
10. Myiarchus:													
36. magnirostris (Gould)	*	×	*	*	*	*	..	×	×	...	...	..	...
11. Coccyzus:													
37. melanocoryphus Vieill	×	×	...	...	...	...	...	...	...	...	..	...	...
12. Asio:													
38. galapagoensis (Gould)	...	...	*	*	...	...	...	...	...	...	...	...	...
13. Strix:													
39. punctatissima Gray	...	...	*	*	...	*	...	...	...	...	..	...	...
14. Buteo:													
40. galapagoensis (Gould)	J	...	*	*	...	*	...	...	...	...	..	...	...
15. Pelecanus:													
41. californicus Ridgw	×	...	...	...	...	...	...	...	...	...	..	...	...
16. Sula:													
42. leucogastra (Bodd.)	...	...	...	...	...	...	...	...	...	...	...	...	...
43. cyanops (Sundev.)	...	...	..	..	...	...	...	...	...	...	...	...	...
44. gossi Ridgw	×	...	...	...	...	...	...	...	...	...	...	...	...
17. Fregata:													
45. aquila (Linn.)	...	...	...	...	...	...	...	...	...	*	..	...	...
18. Phaëthon:													
46. æthereus Linn	...	...	...	...	...	...	...	...	...	*	..	...	...
19. Ardea:													
47. herodias Linn. ?	...	...	*	...	...	...	...	×	...	...	...	...	...
20. Butorides:													
48. plumbeus (Sundev.)	J	...	*	*	...	×	..	×	×	...	...	...	...
21. Nycticorax:													
49. pauper Scl. and Salv	...	...	*	...	...	...	...	...	×	...	...	...	..
22. Phœnicopterus:													
50. ruber Linn	...	×	*	×	...	...	...	...	...	...	...	...	...
23. Querquedula:													
51. versicolor (Vieill.)	...	...	...	...	...	...	...	...	...	...	..	..	...
24. Pœcilonetta:													
52. galapagensis Ridgw	...	×	*	...	...	...	...	...	...	...	...	...	...
25. Zenaida:													
53. galapagoensis Gould	J	...	*	*	*	...	...	×	×	...	...	...	...
26. Porzana:													
54. spilonota (Gould)	...	...	*	*	...	...	...	...	...	...	..	...	...
27. Ægialitis:													
55. semipalmata (Bp.)	...	...	*	..	...	...	...	...	...	...	...	...	...
28. Hæmatopus:													
56. galapagensis Ridgw	J	...	*	×	...	...	..	..	...	...	..	...	...
29. Himantopus:													
57. mexicanus ? (Müll.) ?	...	...	*	×	...	...	...	...	...	...	...	...	...
30. Arenaria:													
58. interpres (Linn.)	...	...	*	...	*	...	...	...	×	...	..	..	...
31. Calidris:													
59. arenaria (Linn.)	...	...	...	...	*	...	...	...	...	...	...	...	...
32. Heteractitis:													
60. incanus (Gm.)	...	...	*	×	...	*	...	...	×	...	...	...	...
33. Tringa:													
61. minutilla Vieill	...	...	*	...	...	...	...	...	...	...	...	...	...
34. Numenius:													
62. hudsonicus Lath	...	...	*	...	...	...	...	...	...	...	...	...	...
35. Anous:													
63. stolidus (Linn.)	×	...	...	...	..	...	...	...	...	...	...	...	...
64. galapagensis Sharpe	×	...	...	...	..	...	...	...	×	...	...	...	...
36. Larus:													
65. fuliginosus Gould	×	*	*	*	...	*	...	...	...	...	...	...	...
37. Creagrus:													
66. furcatus (Néboux)	*	...	...	...	...	...	...	...	...	...	...	...	...
38. Procellaria:													
67 tethys Bp	...	...	...	..	...	...	..	...	...	...	...	...	...
39. Æstrelata:													
68. phæopygia Salv	*	...	...	...	...	...	...	...	...	...	...	...	...
40. Spheniscus:													
69. mendiculus Sundev	...	...	...	*	...	...	×	...	...	...	...	...	...

Following is a summary of the species found to date, on each island, with authorities for their occurrence. Species printed in heavy-faced type are peculiar, so far as known, to the island to which the list in which they occur pertains, while those preceded by a * were first found there by the naturalists of the *Albatross*.

In designating the authorities, the name of the collector is given instead of that of the person publishing the record, except in the case of the *Albatross* collection, which was made by several persons, thus rendering necessary the following explanation: The birds collected by Mr. Darwin were reported on by Mr. John Gould, in the "Zoology of the Voyage of the Beagle," pt. III; those collected by Dr. Kinberg (surgeon and naturalist of the Swedish frigate *Eugenie*), by Prof. C. J. Sundevall, in the "Proceedings of the Zoological Society of London," 1871, pp. 124–130; those obtained by Dr. Habel, by Mr. Salvin, in his monograph so often mentioned on the preceding pages, while nothing has hitherto been published concerning the small collection made by Dr. William H. Jones, U. S. N. (surgeon of the U. S. S. *Wachusett*), on Chatham Island, in 1884, except a description of the new oyster-catcher (*Hæmatopus galapagensis*) which he obtained there.[1]

I. *Species found on Chatham Island.*

1. Nesomimus melanotis. Darwin; Kinberg; *Albatross*.
2. Dendroica aureola. Darwin?; Kinberg?; Jones; *Albatross*.
3. Certhidea olivacea. Darwin; *Albatross*.
4. Geospiza magnirostris. Darwin; *Albatross*.
5. Geospiza strenua. Darwin.
6. **Geospiza dubia.** Darwin.
7. Geospiza fortis. Darwin; *Albatross*.
8. Geospiza nebulosa. Kinberg;
9. Geospiza fuliginosa. Darwin; *Albatross*.
10. Geospiza parvula. Kinberg;

?11. Geospiza dentirostris? (*Fide* Sharpe, Cat. B. Brit. Mus., vol. XII, p. 12.)
*12. **Cactornis brevirostris.** *Albatross*.
*13. Camarhynchus crassirostris. *Albatross*.
14. Camarhynchus prosthemelas. Kinberg; *Albatross*.
?15. Pyrocephalus nanus. Darwin?; *Albatross*?[2]
16. Myiarchus magnirostris. Darwin; Kinberg; *Albatross*.
*17. Coccyzus melanocoryphus. *Albatross*.
18. Buteo galapagoensis. Darwin?; Jones.*
*19. Pelecanus californicus. *Albatross*.
*20. Sula gossi. *Albatross*.
21. Butorides plumbeus. Jones.
22. Zenaida galapagoensis. Jones.
23. Hæmatopus galapagensis. Jones.
24. Anous stolidus. Kellett and Wood; *Albatross*.
*25. Anous galapagensis. *Albatross*.
*26. Larus fuliginosus. *Albatross*.

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[1] See "The Auk," vol. III, July, 1886, p. 331; and Proc. U. S. Nat. Mus., vol. IX, 1886, pp. 325–326.

[2] The Chatham Island bird possibly distinct. (See p. 113.)

27. Creagrus furcatus. Kellett and Wood;[1] *Albatross.*
28. Æstrelata phæopygia. Kellett and Wood.

II. *Species found on Charles Island.*

1. **Nesomimus trifasciatus.** Darwin.
2. Nesomimus melanotis. Darwin; Kinberg; *Albatross.*
3. Dendroica aureola. Darwin ?; Kinberg; *Albatross.*
4. Progne concolor. Néboux.[2]
5. Geospiza magnirostris. Darwin.
*6. Geospiza strenua. *Albatross.*
7. Geospiza fortis. Darwin; Kinberg; *Albatross.*
8. Geospiza nebulosa. Darwin; Kinberg.
9. Geospiza fuliginosa. Kinberg; *Albatross.*
10. Geospiza dentirostris. Markham. (*Fide* Sharpe, Cat. B. Brit. Mus., vol. XII, p. 12.)
11. Geospiza difficilis. Markham. (*Fide* Sharpe, Cat. B. Brit. Mus., vol. XII, p. 12.)
12. Cactornis scandens. Néboux;[2] Kinberg; *Albatross.*
*?13. Camarhynchus crassirostris. Darwin?; *Albatross.*
14. Camarhynchus prosthemelas. Kinberg; *Albatross.*
*15. **Camarhynchus townsendi.** *Albatross.*
*16. **Camarhynchus pauper.** *Albatross.*
?*17. Pyrocephalus nanus. Darwin?; *Albatross.*
18. Myiarchus magnirostris. Kinberg; *Albatross.*
*19. Coccyzus melanocoryphus. *Albatross.*
*20. Phœnicopterus ruber. *Albatross.*
*21. Pœcilonetta galapagensis. *Albatross.*
22. Larus fuliginosus. Darwin?; Kinberg.
23. Zenaida galapagoensis. Néboux;[2] Jones.

III. *Species found on Indefatigable Island.*

1. Mimus melanotis. Kinberg; Habel; *Albatross.*
2. Dendroica aureola. Habel; *Albatross.*
*3. Progne concolor. *Albatross.*
4. Certhidia olivacea. Habel.
5. Geospiza strenua. Habel.
6. Geospiza fortis. Habel; *Albatross.*
7. Geospiza fuliginosa. Habel; *Albatross.*
8. Cactornis scandens. Habel; *Albatross.*
9. Cactornis pallida. Habel.
10. Camarhynchus psittaculus. Habel; *Albatross.*
*11. Camarhynchus crassirostris. *Albatross.*
12. Camarhynchus prosthemelas. Habel.
13. Pyrocephalus nanus. Darwin?; Kinberg; Habel; *Albatross.*
14. Myiarchus magnirostris. Habel; *Albatross.*
15. Asio galapagoensis. Habel.
16. Strix punctatissima. Habel.
17. Buteo galapagoensis. Darwin?; Habel; *Albatross.*
18. Ardea herodias. Habel.
19. Butorides plumbeus. Habel.
20. Nycticorax pauper. Habel; *Albatross.*
21. Phœnicopterus ruber. Habel.
22. Pœcilonetta galapagensis.[3] Habel.

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[1] *Cf.* Salvin, Trans. Zool. Soc. Lond., vol. IX, pt. IX, 1879, p. 506.

[2] *Ibid.*, p. 476.

[3] No specimen seen by me, and identification therefore doubtful.

23. Zenaida galapagoensis. Darwin?; Habel; *Albatross.*
24. Porzana spilonota. Habel.
25. Ægialitis semipalmata. Habel.
26. Hæmatopus galapagensis. Habel.
27. Himantopus mexicanus. Habel.
28. Arenaria interpres. Habel.
29. Heteractitis incanus. Habel.
30. Tringa minutilla. Habel.
31. Numenius hudsonicus. Habel.
32. Larus fuliginosus. Darwin?; Kinberg; Habel; *Albatross.*

IV. *Species found on James Island.*

1. Nesomimus melanotis. Darwin; Kinberg; *Albatross.*
2. Dendroica aureola. Darwin?; Kinberg; *Albatross.*
3. Progne concolor. Darwin; Kinberg.
4. Certhidea olivacea. Darwin; *Albatross.*
5. Geospiza strenua. Darwin; Kinberg.
6. Geospiza fortis. Kinberg; *Albatross.*
7. Geospiza fuliginosa. Darwin; Kinberg; *Albatross.*
8. Geospiza parvula. Darwin.
9. Cactorius scandens. Darwin; Kinberg.
*10. Cactorius pallida?[1]. ? *Albatross.*
11. Camarhynchus psittaculus. Darwin; *Albatross.*
12. Camarhynchus prosthemelas. Kinberg; *Albatross.*
13. Dolichonyx oryzivorus. Darwin.
14. Pyrocephalus nanus. Darwin?; Kinberg; *Albatross.*
15. Myiarchus magnirostris. Kinberg; *Albatross.*
16. Asio galapagoensis. Darwin.
17. Strix punctatissima. Darwin.
18. Buteo galapagoensis. Darwin?.
19. Butorides plumbeus. Kinberg; *Albatross.*
*20. Phœnicopterus ruber. *Albatross.*
21. Zenaida galapagoensis. Kinberg; *Albatross.*
22. Porzana spilonota. Darwin.
*23. Hæmatopus galapagensis. *Albatross.*
*24. Himantopus mexicanus. *Albatross.*
*25. Heteractitis incanus. *Albatross.*
26. Larus fuliginsous. Darwin; *Albatross.*
27. Spheniscus mendiculus. Kinberg.

V. *Species found on Bindloe Island.*

1. Dendroica aureola. Darwin?; Habel.
2. Certhidea fusca. Habel.
3. Geospiza strenua. Habel.
4. Geospiza fortis. Habel.
5. Geospiza parvula. Habel.
6. Cactornis scandens. (*Fide* Sharpe, Cat. B. Brit. Mus.)
7. Cactornis assimilis. Habel.
8. Camarhynchus variegatus. Habel.
9. Camarhynchus habeli. Habel.
10. Pyrocephalus nanus. Habel.
11. Myiarchus magnirostris. Habel.

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[1] Possibly distinct. (See p. 109.)

12. Zenaida galapagoensis. Habel.
13. Arenaria interpres. Habel.
14. Calidris arenaria. Habel.

VI. *Species found on Abingdon Island.*

*1. **Nesomimus personatus.** *Albatross.*
2. Dendroica aureola. Habel.
3. Certhidea fusca. Habel; *Albatross.*
4. Geospiza strenua. Habel; *Albatross.*
5. Geospiza fortis. Habel; *Albatross.*
6. Geospiza fuliginosa. Habel; *Albatross.*
7. Geospiza parvula. Habel; *Albatross.*
8. Geospiza difficilis. Habel; Sharpe; *Albatross.*
9. **Cactornis abingdoni.** Habel; *Albatross.*
10. Camarhynchus variegatus. Habel.
11. Camarhynchus habeli. Habel; *Albatross.*
*12. Pyrocephalus nanus. *Albatross.*
13. Myiarchus magnirostris. Habel; *Albatross.*
14. Strix punctatissima. Habel.
15. Buteo galapagoensis. Habel; *Albatross.*
*16. Butorides plumbeus. *Albatross.*
17. Heteractitis incanus. Habel.
18. Larus fuliginosus. Habel.

VII. *Species found on Albemarle Island.*

1. **Nesomimus parvulus.** Darwin; *Albatross.*
*2. Geospiza fortis. *Albatross.*
*3. Geospiza fuliginosa. *Albatross.*
*4. Spheniscus mendiculus. *Albatross.*

VIII. *Species found on Duncan Island.*

*1. Geospiza fuliginosa. *Albatross.*
*2. Myiarchus magnirostris. *Albatross.*
*3. Ardea herodias? *Albatross.*
*4. Butorides plumbeus. *Albatross.*
*5. Zenaida galapagoensis. *Albatross.*

IX. *Species found on Hood Island.*

*1. **Nesomimus macdonaldi.** *Albatross.*
*2. **Certhidea olivascens.** *Albatross.*
*3. **Geospiza conirostris.*** *Albatross.*
*4. **Geospiza media.** *Albatross.*
*5. Geospiza fuliginosa. *Albatross.*
*6. Myiarchus magnirostris. *Albatross.*
*7. Butorides plumbeus. *Albatross.*
*8. Nyticorax pauper. *Albatross.*
*9. Zenaida galapagoensis. *Albatross.*
*10. Arenaria interpres. *Albatross.*
*11. Heteractitis incanus. *Albatross.*
*12. Anous galapagensis. *Albatross.*

X. *Species found on Tower Island.*

1. Fregata aquila. Habel.
2. Phaëthon æthereus. Habel.

XI. *Island not specified.*

1. Sula leucogastra. Kinberg.
2. Sula cyanops. Kinberg.
3. Querquedula versicolor. Kinberg.
4. Procellaria tethys. Néboux.

Mr. Darwin collected the following species in the Galapagos Archipelago, but did not specify the particular islands upon or near which they were obtained:

1. Pyrocephalus nanus. Several of the islands.
2. Dendroica aureola. Not uncommon on these islands.
3. Geospiza dentirostris. Galapagos Archipelago.
4. Cactornis assimilis. Galapagos Archipelago.
5. Zenaida galapagoensis. Galapagos Archipelago.
6. Ægialitis semipalmata. Galapagos Archipelago.
7. Ardea herodias. Galapagos Archipelago.
8. Nycticorax pauper. Galapagos Archipelago.
9. Heteractitis incanus.[1] Galapagos Archipelago.
10. Tringa minutilla. Galapagos Archipelago.
11. Arenaria interpres. Galapagos Archipelago.
12. Porzana spilonota. Galapagos Archipelago.
13. Pœcilonetta galapagensis.[2] Galapagos Archipelago.
14. Anous stolidus. Galapagos Archipelago.
15. Fregata aquila. Several islands.

The following, obtained by Dr. Kinberg, zoologist and surgeon of the Swedish frigate *Eugenie*, are given in Prof. Sundevall's list (P. Z. S., 1871, pp. 124–130), without special locality:

1. Buteo galapagoensis.
2. Nycticorax pauper. (Given as *Ardea violacea*, L. var.?)
3. Hæmatopus galapagensis? (Given as *H. palliatus*.)
4. Anous stolidus.
5. Pelecanus californicus? (Given as *P. fuscus*.)
6. Sula cyanops. (Perhaps *S. gossi*.)
7. Sula leucogastra.
8. Pœcilonetta galapagensis? (Given as *Anas bahamensis*.)
9. Querquedula versicolor. (Given as *Anas maculirostris*.)

The species common to two or more islands may be grouped, according to our present knowledge, as follows:

Common to Chatham and Charles Islands.

1. Geospiza magnirostris.
2. Geospiza nebulosa.
?3. Geospiza dentirostris.

Common to Chatham and Hood Islands.

1. Anous galapagensis.

Common to Chatham, Indefatigable, and James Islands.

1. Certhidea olivacea.
2. Hæmatopus galapagensis.

Common to Chatham, Charles, Indefatigable, and James Islands.

1. Nesomimus melanotis.
2. Camarhynchus prosthemelas.

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[1] *Totanus fuliginosus* Gould, described as a new species.

[2] Given as *P. bahamensis* Eyt.

Common to Chatham, Indefatigable, James, and Abingdon Islands.
1. Buteo galapagoensis.

Common to Chatham, James, Bindloe, and Abingdon Islands.
1. Geospiza parvula.

Common to Chatham, Charles, Indefatigable, James, and Abingdon Islands.
1. Spheniscus mendiculus.

Common to Chatham, Charles, Indefatigable, James, Bindloe, and Abingdon Islands.
1. Dendroica aureola.
2. Geospiza strenua.
? 3. Pyrocephalus nanus.

Common to Chatham, Indefatigable, James, Abingdon, Duncan, and Hood Islands.
1. Butorides plumbeus.

Common to Chatham, Indefatigable, James, Bindloe, Duncan, and Hood Islands.
1. Zenaida galapagoensis.

Common to Chatham, Charles, Indefatigable, James, Bindloe, Abingdon, and Albemarle Islands.
1. Geospiza fortis.

Common to Chatham, Charles, Indefatigable, James, Bindloe, Abingdon, Duncan, and Hood Islands.
1. Myiarchus magnirostris.

Common to Chatham, Charles, Indefatigable, James, Abingdon, Albemarle, Duncan, and Hood Islands.
1. Geospiza fuliginosa.

Common to Charles and Abingdon Islands.
? 1. Geospiza difficilis.

Common to Charles and Indefatigable Islands.
1. Pœcilenetta galapagensis.

Common to Charles, Indefatigable, and James Islands.
1. Progne concolor.

Common to Charles, Indefatigable, James, and Bindloe Islands.
1. Cactornis scandens.

Common to Indefatigable and James Islands.
? 1. Cactornis pallidac
2. Camarhynchus psittaculus.
3. Asio galapagoensis.
4. Porzana spilonota.

Common to Indefatigable, James, and Abingdon Islands.
1. Strix punctatissima.

Common to Indefatigable and Duncan Islands.
1. Nycticorax pauper.

Common to Bindloe and Abingdon Islands.
1. Certhidea fusca.
2. Camarhynchus variegatus.
3. Camarhynchus habeli.

The following species of birds which have been collected in the Galapagoan Archipelago were not obtained by the naturalists of the *Albatross*:

1. Nesomimus trifasciatus (Gould). Charles.
2. Geospiza magnirostris Gould. Charles; Chatham.
3. Geospiza dubia Gould. Chatham.
4. Geospiza nebulosa Gould. Charles; Chatham.
5. Geospiza dentirostris Gould. Abingdon.
6. Cactornis assimilis Gould. Bindloe.
7. Camarhynchus variegatus Scl. and Salv. Bindloe; Abingdon.

8. Dolichonyx oryzivorus (Linn.). James.
9. Asio galapagoensis (Gould). James; Indefatigable.
10. Strix punctatissima Gray. James; Indefatigable; Abingdon.
11. Sula leucogastra (Bodd.). ("Galapagos.")

?12. Sula cyanops (Sundev.).[1] ("Galapagos.")
?13. Fregata aquila (Linn.).[2] ("Galapagos.")

14. Phaëthon æthereus Linn. Tower Island.
15. Querquedula versicolor (Vieill.). ("Galapagos.")
16. Porzana spilonota (Gould). James; Indefatigable.
17. Ægialitis semipalmata (Bp.). Indefatigable.
18. Calidris arenaria (Linn.). Bindloe.
19. Tringa minutilla Vieill. Indefatigable.
20. Numenius hudsonicus Lath. Indefatigable.
21. Procellaria tethys Bp.(?).
22. Æstrelata phæopygia Salv. Chatham.

Species added to the Galapagoan avifauna by the naturalists of the *Albatross* are the following:

1. Nesomimus macdonaldi, sp. nov. Hood Island.
2. Nesomimus personatus, sp. nov. Abingdon Island.
3. Certhidea cinerascens, sp. nov. Hood Island.
4. Geospiza conirostris, sp. nov. Hood Island.
5. Geospiza media, sp. nov. Hood Island.
6. Cactornis brevirostris, sp. nov. Chatham Island.
7. Camarhynchus townsendi, sp. nov. Charles Island.
8. Camarhynchus pauper, sp. nov. Charles Island.
9. Coccyzus melanocryphus Vieill. Chatham and Charles Islands.

?10. Sula gossi Ridgw.[3] Chatham Island.

Additional localities for species previously taken on the Galapagos are as follows:

1. Progne concolor (Gould). Indefatigable Island.
2. Geospiza strenua Gould. Charles Island.
3. Geospiza fortis Gould. Albemarle Island.
4. Geospiza fuliginosa Gould. Charles, Abingdon, Albemarle, Duncan, and Hood Islands.
5. Geospiza difficilis Sharpe. Abingdon Island.

?6. Cactornis pallida Scl. and Salv. James Island.[4]

7. Camarhynchus crassirostris Gould. Chatham, Charles,[5] and Indefatigable Islands.
8. Pyrocephalus nanus Gould. Chatham ?,[6] Charles, and Abingdon Islands.
9. Myiarchus magnirostris (Gould). Charles, Duncan, and Hood Islands.
10. Ardea herodias Linn. ? Duncan Island.
11. Butorides plumbeus (Sund.). Abingdon, Duncan, and Hood Islands.
12. Nycticorax pauper Scl. and Salv. Hood Island.
13. Phœnicopterus ruber Linn. Charles and James Islands.

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[1] Possibly the same as *Sula gossi*, and not the true *S. cyanops*.

[2] There is a specimen of this species in the *Albatross* collection which had lost its label, and may have come from the Galapagos.

[3] This may possibly be the species referred to by Sundevall and Salvin as *S. cyanops* (Sundev.).

[4] Perhaps a distinct species (*C. hypoleuca* Ridgw.; see p. 109.)

[5] Doubtfully accredited to Charles Island by Mr. Salvin.

[6] Perhaps distinct (*P. minimus* Ridgw.; see p. 113.)

14. Pœcilonetta galapagensis Ridgw.[1] Charles Island.
15. Zenaida galapagoensis Gould. Duncan and Hood Islands.
16. Hæmatopus galapagensis Ridgw.[2] James Island.
17. Himantopus mexicanus (Müll.). James Island.
18. Arenaria interpres Linn. Hood Island.
19. Heteractitis incanus (Gm.). James and Hood Islands.
20. Larus fuliginosus Gould. Chatham Island.
21. Spheniscus mendiculus Sundev. Albemarle Island.

The following species have definite localities for the first time assigned them:

1. Pelecanus californicus Ridgw.[3] Chatham Island.
2. Anous stolidus (Linn.). Chatham Island.
3. Anous galapagensis Sharpe. Chatham and Hood Islands.

The following species were obtained from new localities by Dr. William H. Jones, U. S. N., in 1884:

1. Buteo galapagoensis (Gould).[3] Chatham Island.
2. Butorides plumbeus (Sundev.). Chatham Island.
3. Zenaida galapagoensis Gould. Chatham Island.
4. Hæmatopus galapagensis Ridgw. Chatham Island.

It is very evident from the above showing that the avifauna of the Galapagos Archipelago is by no means exhausted as a field for promising research in the problem of the "derivative origin of species." Future explorations will no doubt add new species and extend the range of those already known. The largest island of the group, Albemarle, is still almost untouched, only four species having as yet been collected there; two islands (Wenman and Culpepper) have not been explored at all, while it can safely be said that on none of the islands has anything like a thorough investigation of the bird-fauna been made. The many interesting problems yet to be worked out will require a careful exploration of every island, by some one competent to study carefully and intelligently each species in relation to its congeners and its conditions of environment; its differences of plumage according to sex, age, and season, and to what extent, if any, migration from one island to another takes place. Many changes in the bird-fauna of these islands have doubtless been wrought by the hand of man, through destruction of birds for food, and disturbance by the introduction of domestic animals; therefore, it is earnestly to be hoped that the subject may receive the careful attention which its importance merits before these changes have gone so far as to render investigation more difficult and its results less satisfactory.

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[1] =*Dafila bahamensis* Salv., *Anas bahamensis* Sundev. ?
[2] =*Hæmatopus palliatus* of Salvin and Sundevall ?
[3] =*P. fuscus* of Salvin and Sundevall ?

SCIENTIFIC RESULTS OF EXPLORATIONS BY THE U. S. FISH COMMISSION STEAMER ALBATROSS.

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No. II.—BIRDS COLLECTED ON THE ISLAND OF SANTA LUCIA, WEST INDIES, THE ABROLHOS ISLANDS, BRAZIL, AND AT THE STRAITS OF MAGELLAN, IN 1887-'88,

BY

ROBERT RIDGWAY,
Curator of the Department of Birds.

A.—ISLAND OF SANTA LUCIA.

Family MIMIDÆ.

1. **Margarops montanus** (VIEILL.).

Port Castries, December 2; one specimen.

Family MNIOTILTIDÆ.

2. **Leucopeza semperi** SCL.

Port Castries, December 1; one specimen.

3. **Dendroica delicata** (RIDGW.).

Dendroica adelaidæ delicata RIDGW., Pr., U. S. Nat. Mus., v, 1882, 525.
Dendroica delicata SHARPE, Cat. B. Brit. Mus., x, 1885, 306.

Family CŒREBIDÆ.

4. **Cœrebamartinicana** (REICH.).

Seven specimens. Four of these have the superciliary stripe wholly white, and three bright yellow passing into white anteriorly, thus showing that my *Certhiola finschi* (Pr. U. S. Nat. Mus., VIII, September 20, 1885, 25) is untenable.

Family VIREONIDÆ.

5. **Vireo calidris dominicana** (LAWR.).

Two specimens.

Family FRINGILLIDÆ.

6. **Loxigilla noctis sclateri** ALLEN.

Three specimens.

7. **Euetheia richardsoni** (CORY).

Loxigilla richardsoni, CORY, Auk, III, 1886, 382; Ibis, 1886, 472, 475; B. West Indies, 1889, 290.

One specimen.

The bill of this species is so very different in shape from that of any species of *Loxigilla*, that it should either be made the type of a new genus or referred to *Euetheia*, the latter alternative being my preference.

8. **Euetheia bicolor** (LINN.).

Two specimens.

Family ICTERIDÆ.

9. **Icterus laudabilis** SCL.

One specimen.

10. **Quiscalus inflexirostris** SW.

One specimen.

Family TYRANNIDÆ.

11. **Tyrannus rostratus** SCL.

One specimen.

12. **Elainea martinica** (LINN.).

One specimen.

Family TROCHILIDÆ.

13. **Eulampis holosericeus** (LINN.).

Two specimens.

14. **Bellona cristata** (LINN.).

Four specimens.

Family CUCULIDÆ.

15. **Coccyzus minor** (GM.).

Two specimens.

B.—ABROLHOS ISLANDS.

Family PHAËTHONTIDÆ.

1. **Phaëthon æthereus** (LINN.).

Five specimens.

Family SULIDÆ.

2. **Sula cyanops** (SUND.).

One specimen.

3, **Sula leucogastra** (BODD.).

Two specimens, adult male and female. These are alike in plumage, but have the feet very differently colored, those of the male being dull greenish while those of the female are clear pale yellow. It would be interesting to know whether this difference is constant.

Family ARENARIIDÆ.

4. **Arenaria interpres** (LINN.).

One specimen.

Family CHARADRIIDÆ.

5. **Ægialitis semipalmata** (BP.).

One specimen.

C.—STRAITS OF MAGELLAN.

Family TURDIDÆ.

1. **Merula magellanica** (KING).

Laredo, Port Otway, and Port Churruca, four specimens.

Family TROGLODYTIDÆ.

2. **Troglodytes hornensis** LESS.

Laredo, four specimens.

3. **Cistothorus platensis** (LATH.) ?.

Gregory Bay. An adult female, apparently this species, but very much paler than two adults from Santiago, Chili (July). The difference in color may be seasonal, the Gregory Bay specimen having the plumage considerably worn and evidently faded; but it may prove to belong to a different race or subspecies.

Family MOTACILLIDÆ.

4. **Anthus correndera** (VIEILL.).

Gregory Bay, one specimen; Point Elizabeth. two young (full-fledged).

Family HIRUNDINIDÆ.

5. **Tachycineta meyeni** (BONAP.).

Laredo Bay, one specimen.

6. **Atticora cyanoleuca** (VIEILL.).

Port Elizabeth and Gregory Bay, two specimens.

Family FRINGILLIDÆ.

7. **Spinus barbatus** (MOL.).

Sandy Point, two specimens, male and female. Laredo, one specimen, young.

8. **Phrygilus formosus** (GOULD),= *P. gayi* (EYD. and GERV.) AUCT.*

Sandy Point, one specimen.

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* *Cf.* Proc. U. S. Nat. Mus., vol. x, 1887, pp. 431–433.

9. **Phrygilus gayi** (EYD. and GERV.).

Gregory Bay, two adults; Laredo Bay, two young. (*Cf.* Proc. U. S. Nat. Mus., vol. x, 1887, pp. 431–433.)

10. **"Zonotrichia" canicapilla** GOULD.

Gregory Bay, two specimens; Elizabeth Island, two specimens.

Family ICTERIDÆ.

11. **Trupialis militaris** (LINN.).

Gregory Bay, two specimens; Laredo Bay, one specimen.

12. **Curæus curæus** (MOL.).

Port Churruca and Laredo Bay, two specimens.

Family TYRANNIDÆ.

13. **Tænioptera pyrope** (KITTL.).

Laredo Bay, four specimens; Port Otway, one specimen.

14. **Muscisaxicola mentalis** D'ORB. and LAFR.

Sandy Point, one specimen; Latitude Cove, one specimen (young); Mayne Harbor, one specimen.

Mr. Sclater has recently (Cat. B. Brit. Mus., XIV, p. 56) referred this species to *M. macloviana* (Garn.) of the Falkland Islands, but seems to be not quite convinced of their identity, since he states his inability to see how they "can be *fairly* separated." The doubt expressed by the word "fairly" (not italicized in the original) would seem to imply that some difference exists, and until they can be proven identical I prefer to keep them separate, as the safer course.

15. **Centrites niger** (BODD.).

Gregory Bay, four specimens; Elizabeth Island, two specimens.

16. **Elainea albiceps** (D'ORB. and LAFR.).

Laredo Bay, three specimens; Sandy Point, three specimens; Port Otway, one specimen; Port Churruca, one specimen.

17. **Anæretes parulus** (KITTL.).

Sandy Point, two specimens; Mayne Harbor, one specimen.

Family DENDROCOLAPTIDÆ.

18. **Oxyurus spinicauda** (GMEL.).

Laredo Bay, four specimens; Port Otway, one specimen.

19. **Synallaxis anthoides** (KING).

Laredo Bay, one specimen.

20. **Cinclodes patagonicus** (GMEL.).

Gregory Bay, Elizabeth Island, and Port Otway, three specimens.

21. **Cinclodes fuscus** (VIEILL.).

Gregory Bay, Laredo Bay, and Elizabeth Island, three specimens.

22. Geositta antarctica LANDB. ("Weigm. Archiv., Jahr. 46, I, 275") ?

Elizabeth Island, one specimen.

This bird is referred, with doubt, to *G. antarctica* for the reason that it does not agree with either of the six species given in the *Nomenclator Avium Neotropicalium* (four of which are in the National Museum collection), nor with any of the species not therein mentioned, with the possible exception of *G. antarctica*, a description of which I have not been able to consult.*

Compared with *G. cunicularia* (Vieill.), *G. crassirostris* Scl., *G. isabellina* (Ph. and Landb.), *G. fasciata* (Ph. and Landb.), *G. frobeni* (Ph. and Landb.†), and *G. maritima* LAFR. and D'ORB., with all of which it has been directly compared, the bird in question is found to differ strikingly from them all in much longer wings and tail and shorter bill, which raises the suspicion that it may not be a *Geositta* at all, though it certainly cannot be referred to the allied genus *Cinclodes*, or any other thus far characterized. Of the species named above it comes much nearest to *G. cunicularia*, both in size and coloration; but the bill is not more than two-thirds as long, the wing about .70 of an inch longer (with primaries .85 of an inch longer than longest tertials, instead of barely exceeding them in length), and the tail .40 of an inch longer. The coloration is, at first glance, very similar to that of *G. cunicularia*, the upper tail-coverts being of exactly the same buffy whitish; but the upper surface is more ashy, the tail-feathers much darker, the breast very faintly instead of heavily marked, and the inner webs of the primaries a dull isabella color instead of bright cinnamon, while the secondaries (except tertials) are wholly uniform drab, without the broad subterminal dusky band of *G. cunicularia*.

Should the species prove to be distinct from *G. antarctica*, I propose to name it *G. longipennis*.‡

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* The reference quoted above, the source of which I have forgotten, is evidently incorrect, no such bird being mentioned in Weigman's "Archives" for 1846.

† *G. frobeni* (*Certhilanda frobeni*, PH. and LANDB., Weigm. Archiv., 1865, 62; *Geositta frobeni* TACZ., Orn. du Pérou, II, 95) is perfectly distinct, differing from all the other species, as correctly stated by its describers, in the distinctly white color of the basal half of the tail, nearly the whole of the outer feather being of that color. The U. S. National Museum possesses a single, very imperfect, skin obtained by Mr. Walter S. Church at Audahuaylas, Ayacucho, Peru, October 14, 1864.

‡With the following characters:

Geositta longipennis sp. nov.

SP. CHAR.—*Adult female* (type, No. 116173, Point Elizabeth, Straits of Magellan, January 20, 1888; U. S. S. *Albatross*): Above dull brownish gray, the forehead and hind neck indistinctly spotted or mottled with pale grayish buffy; upper tail-coverts buffy whitish; general color of closed wing drab, the middle and posterior row of lesser coverts broadly but not sharply margined at tips with pale grayish buffy; primary coverts dusky terminally, their tips margined with pale grayish buffy; tertials with a wedge-shaped basal patch of cinnamon-drab, succeeded by a somewhat V-shaped patch of dusky, terminal and exterior portion drab, narrowly edged with whitish; secondaries and four inner primaries uniform drab, the color exactly the

23. Upucerthia propinqua sp. nov.

SP. CHAR.—Similar to *U. dumetoria* Geoff. and D'Orb., but much grayer above, less tinged with brown beneath, the squamate markings on the breast much more distinct, tail-feathers (except middle pair) much blacker, with ochraceous more restricted, inner webs of secondaries decidedly dusky for terminal half, tawny spaces on inner webs of primaries much more sharply defined against much darker color of terminal portion, and the bill shorter and proportionally broader at the base.

HAB.—Straits of Magellan (Gregory Bay).

Adult female (type, No. 116224, Gregory Bay, Straits of Magellan; U. S. S. *Albatross*): Above hair-brown, somewhat darker on pileum and browner (broccoli-brown) on middle tail-feathers; alula, terminal portion of primaries and their coverts, and outer webs of six outer primaries, except at base of fifth and sixth, dusky; outer webs of secondaries (except tertials) and four inner primaries, and basal portion of the fifth and sixth, dull russet or tawny-brown, the basal half (approximately) of inner webs of secondaries and extensive wedge-shaped spaces on inner webs of primaries clearer tawny; three outer tail-feathers dull black, tipped with ochraceous-buff, this broadest on exterior feathers, where extending along outer web nearly an inch from tip; fourth feather dull black terminally, fading into broccoli-brownish basally, the tip narrowing and indistinctly dull whitish; fifth feather broccoli-brown suffused with dusky near tip. A broad superciliary stripe of dull brownish white sparsely streaked with dusky; auriculars grayish brown streaked with dusky; cheeks and entire under parts dull white, the former, with chest, breast, and anterior portion of sides marked with squamate edgings of dull blackish or dusky, these largest on pectoral region; feathers of throat tipped with blackish; longer under tail-coverts pale brown, tipped with whitish; axillars and under wing-coverts pale cinnamon-buff. Bill black, under mandible more brownish basally; tarsi dusky horn-color; feet brownish black. Length (skin), 7.90; wing, 3.95; tail, 3.35; exposed culmen, 1.08; tarsus, 1.02; middle toe, .68.

The specimen described above differs equally from each of the four

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same on both webs; rest primaries similar, but with a broad, abruptly black, subterminal space, succeeded by a whitish terminal margin; six middle tail-feathers dull blackish, passing into drab exteriorly and terminally, the edges still paler, the concealed basal portion buff; next feather similar, but outer web chiefly pale buff; next similar, but with more buff on inner web; outer feather with exterior web wholly pale buff, the inner web deeper buff, with an oblique dusky space near tip, following curve of margin; a broad superciliary stripe of pale grayish buff, less distinct anteriorly; chin and throat white; rest of lower parts pale, dull grayish buff, or dull buffy whitish, becoming nearly pure white on belly and clear pale buff on lower tail-coverts; breast faintly variegated with broad but very indistinct edgings of grayish brown; axillars and under wing-coverts deep cinnamon-buff. Length (skin), 6.30; wing, 4.30; tail, 2.55; exposed culmen, .52; bill from nostril, .38; tarsus, .88; middle toe, .53.

examples of *U. dumetoria* from Chili (Santiago and Valley del Yeso) with which it has been compared. All the latter also show quite distinct paler streaks on the hind neck, which are not observable in the Gregory Bay bird.

Family PTEROPTOCHIDÆ.

24. **Hylactes tarnii** King.

Port Otway; two specimens.

25. **Pteroptochus rubecula** Kittl.

Port Otway; four specimens.

26. **Scytalopus magellanicus** (Lath.)?.

Otter Bay, one adult female; Port Churruca, two young.

I am unable to determine whether these specimens are *S. magellanicus* or *S. obscurus* (King). According to Dr. Sclater (Ibis, 1874, pp. 192–194), these two species are "easily distinguishable," the latter "by its larger size, more cinereous color, longer tail, and the faint bars across the rump and lower belly." Yet the alleged difference of size is by no means shown by the measurements which Dr. Sclater himself gives, which are as follows:

S. magellanicus ("smaller"). Wing, 2.20; tail, 1.50.
S. obscurus ("larger"). Wing, 2.00; tail, 1.60.

The adult female from Otter Bay measures: wing, 2.00; tail, 2.30. On the other hand, an adult female from Santiago, Chili, determined by Dr. Sclater as *S. magellanicus*, has the wing 1.95 and the tail 1.60, while it has the hinder parts of the body, both above and below, distinctly barred with dusky—a character said to distinguish *S. obscurus*.

It is very evident that the birds of this genus need careful revision; but lacking sufficient material I am unable to give them further attention at present.

27. **Scytalopus albifrons** (Landb.).

Port Otway, two specimens, adult female and young, the former agreeing minutely with a specimen from Valdivia, Chili, received from the National Museum of Chili.

This species is certainly distinct from *S. magellanicus*, as Mr. Allen has already shown (Bull. Am. Mus. Nat. Hist., vol. II, No. 2, p. 99).

Family TROCHILIDÆ.

28. **Eustephanus galeritus** (Mol.).

Port Otway, two specimens.

Family PICIDÆ.

29. **Dryobates lignarius** (Mol.).

Laredo Bay, one specimen.

30. **Campephilus magellanicus** (King).

Laredo Bay and Sandy Point, two specimens.

Family ALCEDINIDÆ.

31. **Ceryle stellata** (MEYEN).
Port Otway and Port Churruca, two specimens.

Family ARIDÆ.

32. **Pyrrhura smaragdina** (GMEL.).
Sandy Point, three specimens.

Family BUBONIDÆ.

33. **Glaucidium nanum** (KING).
Laredo Bay, two specimens.

34. **Bubo magellanicus** (GM.).
Gregory Bay, one specimen.

Family FALCONIDÆ.

35. **Falco peregrinus** TUNST.
Elizabeth Island, one specimen (adult male).

36. **Falco sparverius cinnamominus** (SW.).
Sandy Point, one specimen (young female).

37. **Polyborus tharus** (MOL.).
Elizabeth Island, two specimens.

38. **Milvago chimango** (VIEILL.).
Laredo Bay, three specimens.

Family BUTEONIDÆ.

39. **Geranoaëtus melanoleucus** (VIEILL.).
Elizabeth Island, one specimen.

Family HÆMATOPODIDÆ.

40. **Hæmatopus ater** (VIEILL.).
Elizabeth Island, two specimens.

41. **Hæmatopus leucopus** (GARN.).
Elizabeth Island, one specimen.

Family CHARADRIIDÆ.

42. **Belonopterus chilensis** (MOL.).
Gregory Bay, one specimen.

43. **Ægialitis falklandica** (LATH.).
Laredo Bay, one specimen.

44. Zonibyx modesta (LICHT.).

Port Otway, one specimen.

The single specimen obtained appears to be the true *modesta* and not the Chilian form, distinguished by Mr. Seebohm (Geog. Distr. Charadriidæ, p. 106) as *Charadrius modestus rubecola* (*ex Charadrius rubecola* Vig., Zool. Jour., IV, 1829, p. 96).

Family SCOLOPACIDÆ.

45. Gallinago paraguayæ (VIEILL.).

Gregory Bay and Laredo Bay, two specimens.

46. Tringa fuscicollis VIEILL.

Gregory Bay, one specimen.

47. Totanus flavipes (GMEL.).

Gregory Bay, one specimen.

Family RALLIDÆ.

48. Fulica leucoptera VIEILL.

Sandy Point, one specimen; certainly referable to this species rather than to *F. leucopyga* Licht.

Family ARDEIDÆ.

49. Nycticorax obscurus BONAP.

Port Otway, two specimens.

In the "Water Birds of North America" (vol. I, p. 56), I have expressed my inability to distinguish satisfactorily this form from the ordinary American bird (*N. nycticorax nævius*); but the specimens obtained by the naturalists of the *Albatross* show that the examples (eight in number), on which that statement was based, were not the true or typical *N. obscurus*, as was supposed.

Neither of the two *Albatross* specimens is adult, though one is very nearly so. This one (No. 116282, obtained February 10) is wholly of a dark sooty color, approaching black on the head and neck, and the back glossed with greenish bronze. The under surface of the body is nearly as dark as the upper, but rather more brownish in hue. The younger specimen (No. 116283, ♀, same date) is essentially similar in color except that the throat, fore neck, under parts, back, scapulars, and wing coverts are narrowly streaked with buff, these streaks broadest on the under surface of the body.

Without having seen adult specimens, I can not, of course, express a decided opinion as to whether the present bird should rank as a species or subspecies; but, considering the marked individual variation in color among the eight examples examined when the remarks above referred to were written, I am at present inclined to the belief that the true *N. obscurus* is simply an extreme variation, or melanism, of the same form as the lighter colored birds from Chili and other parts of southern South America.

Family ANATIDÆ.

50. **Chloephaga magellanica** (Gmel.)

Elizabeth Island, one specimen (adult female).

51. **Chloephaga antarctica** (Gmel.).

Two specimens (male and female), without labels.

52. **Tachyeres cinereus** (Gmel.).

Elizabeth Island, one specimen. Also two specimens without labels.

53. **Pœcilonetta cristata** (Gmel.).

Elizabeth Island, one specimen (adult female).

54. **Nettion flavirostris** (Vieill.).

Port Famine, two specimens; Sandy Point, one specimen.

55. **Querquedula versicolor** (Vieill.).

Gregory Bay; one specimen.

Family PHALACROCORACIDÆ.

56. **Phalacrocorax vigua** (Vieill.).

Port Otway, one adult female, in nearly full nuptial plumage.

This species is the *P. brasilianus* (Gmel.) of authors, based on *Puffinus brasiliensis* Brisson, the latter based on the *Majague* of Pison; but it is almost incomprehensible how such an identification should have been made, Pison's bird being described by Brisson as having the *feathers* of the throat or lower neck *yellow* ("*quæ partem colli inferiorem obtegunt, sunt flavæ*") and if a *Phalacrocorax* at all cannot possibly be identified with this or any other known species. On the other hand, Vieillot's "Le Cormoran vigua, *Hydrocorax vigua*" (Nouv. Dict. Hist. Nat., VIII, 1817, p. 90) from Paraguay, is unquestionably this species, and probably the oldest name for it.* Vieillot's description coincides very minutely with the *Albatross* specimen, except that the latter lacks the lengthened whitish filamentous feathers behind the eyes, which, being exceedingly temporary, have probably been lost, or possibly not yet assumed.

Phalacrocorax vigua (Vieill.) is very closely allied to *P. mexicanus* (Brandt); so closely, in fact, that the differences are not readily expressed, being, in fact, not greater than between the different races of *P. dilophus*, as, for example, the true *P. dilophus* and *P. dilophus floridanus*. The only differences which I am able to discern consist in the somewhat smaller size of *P. mexicanus*, and somewhat paler and browner central areas of the wing-coverts, scapulars, and interscapulars, rendering the black borders to these feathers rather more distinct. But I very much doubt whether these slight differences in coloration would prove constant were a series of specimens of the two forms compared. In short, it seems almost certain that *P. mexicanus* is simply a smaller intertropical race of *P. vigua*, in which case it should be called *P. vigua mexicanus*.

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* Bonaparte (*Consp.*, II. p. 172) and Schlegel (*Hist. Nat. Mus. P.-B.*, VI, No. 21, livr. 4, *Pelecani*, p. 22) make matters still worse, by including *P. dilophus* and other species together with the present one under the species they call *P. brasilianus!*

57. **Urile magellanica** (GMEL.).

San Martin Island, one specimen.

58. **Urile albiventer** (LESS.)?.

San Martin Island, one adult female..

This is apparently the species called *Phalacrocorax albiventris* by Sclater and Salvin (Voy. *Challenger*, Zoölogy, vol. II, pt. VIII, p. 121, pl. 25, fig. 2), but the crest is different both as to position and form from that indicated in both the description and figure cited, since it springs directly from the forehead instead of the middle of the crown, and the feathers are quite straight instead of being distinctly recurved.

Family LARIDÆ.

59. **Larus dominicanus** LICHT.

Sandy Point, six specimens; Elizabeth Island, one specimen.

60. **Larus glaucodes** MEYEN.

Port Otway, three specimens.

61. **Sterna hirundinacea** LESS.

Elizabeth Island and Point Grappler, two specimens.

Family STERCORARIIDÆ.

62. **Megalestris antarcticus** (LESS.).

St. Peter and St. Paul Island, one specimen.

Family DIOMEDEIDÆ.

63. **Diomedea melanophrys** TEMM.

One specimen, without label.

Family PROCELLARIIDÆ.

64. **Puffinus major** FABR.

"Off Patagonia," one specimen.

Family COLYMBIDÆ.

65. **Colymbus rollandi** (QUOY and GAIM.).

One specimen; locality not given.

Family SPHENISCIDÆ.

66. **Spheniscus magellanicus** (FORST.).

Two specimens, without labels.

SCIENTIFIC RESULTS OF EXPLORATIONS BY THE U. S. FISH COMMISSION STEAMER ALBATROSS.

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No. III.—REPORT ON THE BATRACHIANS AND REPTILES COLLECTED IN 1887-'88.

BY

E. D. COPE.

The contents of the following list are arranged in accordance with the localities visited by the *Albatross*, and in the order in which they were reached in a voyage from Washington to San Francisco via Cape Horn.

I. WEST INDIES.

1. **Bufo agua** DAUD.

Santa Lucia.

2. **Anolis alligator** D. and B.

Santa Lucia.

3. **Liophis ornatus** GARMAN.

Dromicus ornatus GARMAN, Proceeds. Amer. Philos. Society, 1887, p. 281.

Santa Lucia, No. 15084.

This species is clearly a *Liophis*, and it resembles no other species of the genus. The scuta of the only specimen are 195, 1–1, 88. The color differs a good deal from the type as described by Garman, in the dark color of the sides. This is not clearly distinguished as a band, and it is interrupted by light vertical spots of irregular outlines.

4. **Bothrops caribbæus** GARMAN.

Trigonocephalus caribbæus GARMAN, Proceeds. Amer. Philosoph. Proc., 1887, p. 285.

Santa Lucia, Nos. 15082–3.

This species is nearly allied to the *B. atrox*, but differs very much in the coloration.

II. EAST COAST OF BRAZIL.

5. **Taraguira torquata** WIED.

Abrolhos Islands, Nos. 15107–19.

III. ARGENTINE CONFEDERATION.

6. **Nannophryne variegata** GÜNTHER.

Two specimens, 15123–4, from Mayne Harbor, Patagonia. Prof. L. A. Lee.

The genus *Nannophryne* differs from *Bufo* in the entire absence of the *cavum tympani* and Eustachian tubes. It is identical with *Ollotis* Cope, and the name proposed by Günther must be retained as it was published in 1873, while *Ollotis* was not proposed until 1875. *Nannophryne* (*Ollotis*) *cærulescens* Cope is from the Cordilleras of Costa Rica.

In the *Zachænus roseus*, described below, the auditory organs, though present, are minute. From the same region two other genera with imperfect auditory organs are known, *Alsodes* Bell and *Eusophus* Cope (= Cacotus Gthr.). I have already called attention to the tendency to this peculiarity among the Salientia which inhabit mountainous regions.* *Cophæus*, *Batrachophrynus* and *Telmatobius* are from the Peruvian Andes, and *Crepidophryne*, *Cranophryne*, and *Nannophryne* from the Cordilleras of Central America.

7. **Zachænus roseus** sp. nov. Cystignathidarum.

Head and body rather short; hind legs elongate. Width of head entering length of head and body, two and a half times, and equal the length of the head measured on the side to the middle of the tympanic drum. Heel of extended hind leg reaching a point between the orbit and the nostril. Head depressed, muzzle but little prominent in profile; nostril but little nearer end of muzzle than to eye. Tympanic disk a vertical oval, not defined below, but, if completed, measuring less than half eye-fissure. Interorbital space flat, wider than eye-fissure. Tongue a longitudinal oval, but little free, and slightly notched posteriorly. Vomerine teeth in two fascicles near each other, and just posterior to the line connecting the posterior borders of the internal nares. Internal nares minute.

Skin smooth above and below; the abdominal integument forming a disk, the anterior fold of which extends from axilla to axilla. A narrow glandular fold from the posterior part of the eyelid to just above the axilla. Digits with slight tubercles below, and the inferior surfaces of their extremities thickened. First finger shorter than second. Toes rather short, with indistinct dermal borders. An internal, but no external solar tubercle. No tarsal tubercle; the thin inner edge turned upwards.

Color, pale rose gray above, dirty white below. A black band extends from the end of the muzzle along the canthus rostralis, and follows the glandular fold to its end above the axilla. A branch descends, and, crossing the tympanic drum, stops a short distance in front of the shoulder. Limbs with very indistinct dusky cross-bars. Tarsus dusky below. Two large brown spots on the front side of the fore-arm. Two similar spots on the proximal half of the front of the tibia.

Length of head and body, 23^{mm}; of head to posterior edge of tympanum (axial), 7.5^{mm}; width at canthus oris, 9^{mm}; of fore leg, 14^{mm}; of fore foot, 6^{mm}; of hind leg from vent, 37^{mm}; of hind foot, 15.5^{mm}; of tarsus, 8^{mm}; of tibia, 11.5^{mm}.

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* Batrachia and Reptilia of Costa Rica: Journal Academy Philada., VII, p. 95.

One specimen, No. 15126, from Port Otway, Patagonia. Dr. L. A. Lee.

This species is the second of the genus *Zachænus*, the typical one being the *Z. parvulus* Girard from near Rio Janeiro. The *Z. roseus* is of less robust form than the *Z. parvulus*, has no dermal folds on the back, and the prefrontal bones are widely separated, and the vomerine teeth are not in arched series. *Zachænus* has a simple cartilaginous sternum, and the terminal phalanges are simple. These characters, with the complete frontoparietal bones, place it in the group *Ceratophrydes*, where it forms the approach to the group *Hylodes*.

8. **Batrachyla leptopus** BELL., Zoology of the Voyage of the Beagle, III, p. 43, pl. 18, fig. 5. *Hylodes leptopus* BOULENGER, Catal., Batr.-Sal. Brit. Mus., 1882, p. 219. No. 15125.

The genus *Batrachyla* may be now correctly defined for the first time. It enters the group *Hylodes* of the family *Cystignathidæ*. That is, it has the external metatarsals united, the terminal phalange with a transverse terminal branch, and the sternum a simple cartilaginous plate. A frontoparietal fontanelle, vomerine teeth, and Eustachian tube. Toes free.

This genus in its cranial fontanelle approaches nearer to *Malachylodes* Cope (founded on a Mexican species) than to any other genus of *Cystignathidæ*. It differs from this form in the presence of vomerine teeth. In its membraneous cranial roof it possesses a character of inferiority, as all the Batrachian forms of Patagonia do in some respect or other, as compared with their allies elsewhere.

9. **Leptodactylus ocellatus.**

Buenos Ayres, Nos. 14889–94.

10. **Hydromedusa tectifera** COPE.

Buenos Ayres, No. 15189.

IV. CHILI.

11. **Paludicola frenata** sp. nov.

Well developed inguinal glands. No tarsal tubercle; metatarsal tubercles two, both of conic form, the internal the larger. Toes free, like the fingers without dermal lateral ridge or wing. Heel of extended hind leg reaching to posterior border of orbit. Skin with a few small low tubercles.

Muzzle obtuse, projecting a little beyond lip-border, narrowed above. Nostril nearer orbit than lip-border. Tympanum hidden. Vomerine teeth in oblique fascicles between nares. Choanæ and ostia pharyngea small. Tongue very slightly emarginate. First finger longer than fourth, and much longer than the second, which consists of the metacarpal only. Third and fifth toes subequal. Skin without definite folds above or below. Posterior face of femur tubercular.

Ground-color gray. A row of six or seven blackish-light-bordered spots on each side of the median line. One of these pairs is between the orbit; one on the interscapular, and one on the sacral regions, and four or five small ones on each side of the urostyle. Two spots posterior to each orbit, the inferior much the larger, and extending posteriorly to the humerus, and in line anteriorly with a band on the canthus rostralis which extends to the upper lip. A dark triangular spot below the eye. Inguinal gland anteriorly light, posteriorly black. Limbs cross-banded (four bands on tibia); inferior surfaces immaculate.

	M.
Length of head and body	.029
Length of head to canthus oris	.0075
Length of head to canthus oculi anterior	.0035
Width of head at canthus oris	.010
Length of fore leg	.016
Length of hind leg from vent	.040
Length of hind foot	.020
Length of tarsus	.007

The extreme reduction of the second anterior digit is a remarkable feature of the individual which represents this species. The character appears to be normal, but the first finger on one of the hands is also abbreviated, though to a less degree than the second digit. This is clearly abnormal, since it is unsymmetrical, but it may be an imperfect expression of the tendency so distinctly marked in the second digit.

From Lota, No. 15129.

12. Liolaemus chilensis Lesson.

Tomé, No. 15128.

13. Liolæmus tenuis Bell.

Lota, No. 15127.

14. Opheomorphus chamissonis Wieg.

Coluber chamissonis Weig. *C. temminckii* Schleg.
Drômicus temminckii D. and B.* *Aporophis temminckii* Cope.

The species referred to *Aporophis* m., are generally more slender than the typical forms of *Opheomorphus* m., but they can not be retained in a distinct genus. Lota, 15130.

V. Pacific Coast.

15 Gonatodes albigularis fuscus Hallow.

Panama, No. 15132.

16. Anolis pentaprion Cope.

Panama, No. 15131.

17. Pelamis bicolor Daud. 15188.

VI. Galapagos Islands.

18. **Phyllodactylus tuberculosus** Wiegm.

Chatham Island, Nos. 14949 and 14956. The first record of the occurrence of this species on the Galapagos.

19. **Phyllodactylus galapagoensis** Peters.

The single specimen of this species differs from the description given by Peters in the decidedly larger abdominal scales, but it agrees with that of Boulenger in the British Museum Catalogue.

20. **Phyllodactylus leei** sp. nov.

Scales of the superior surfaces of equal size, one-fourth as large as the abdominals, convex. Scales of belly numbering 43 between the transverse lines connecting the axillæ and the groins. Digital pallets wider than digits. Scales of upper surface of fore limbs and feet, and of upper surface of tibia and hind feet, as large as those of the abdomen; those of the feet more or less serrate. No row of scuta on inferior side of tail. Auricular meatus small, but little larger than a digital pallet. Superior labials six to front border of pupil; inferiors larger, 4½ to the same point. Symphyseal large, urceolate, followed by two scuta, behind which the scales become gradually smaller.

Color above brown with a reddish tinge, marked with indistinct darker speckles. Sides of head paler than top, a dark band passing from end of nose through eye, above auricular meatus to near shoulder. Limbs speckled above. Below, cream-color, brownish on throat.

Measurements.

	Mm.
Total length	80
Length to vent	41
Length to canthus oris	7.5
Width to canthus oris	7
Length of fore leg	11
Length of hind leg	16
Length to axilla	19

Chatham Island, No. 14957. Dedicated to Prof. Leslie A. Lee, the naturalist of the expedition.

21. **Tropidurus grayi** Bell.

Nos. 14897–924, James Island; 14926–930, Gardner's Island, 14931–40, Indefatigable Island; 15003–13, Albemarle Island; 15014–26, Hood Island.

A variety with a dark lateral band, not very distinct, from Duncan Island, 14941–44. The most abundant reptile of the Archipelago.

22. **Tropidurus lemniscatus** sp. nov.

Scales of regularly graduated size from dorsal to ventral region, those of the sides a little larger than those of the belly and the dorsal a little larger. Dorsal scales in rows which converge posteriorly;

laterals in vertical rows. Fifty rows of ventral scales between lines of axilla and groin. Dorsal crest low, becoming more elevated on the proximal caudal region. Toes of extended hind leg reaching to orbit. A strong fold bordered with a few large scales in front of the humerus and an open pocket in front of it lined with granular scales. Auricular meatus three-quarters the length of the eye, bordered in front by a few acuminate scales. Frontal scales divided longitudinally. Scales of top of muzzle more divided than in *T. grayi*, the six large scales of the latter represented by nine or ten. One row of large and two or three rows of small superciliary scales. Nostril subvertical in direction.

Color dark olive with a light greenish or brownish gray band extending from the orbit to the base of the tail. The dark olive of the back is dark bordered; the light band is more or less brown speckled, and the dark of the sides is more or less light cross-barred, and it is frequently bounded below by a second light longitudinal band. Integument within prehumeral fold black. Top of head and limbs nearly uniform brown; lower surfaces light yellowish.

The females are smaller than the males, and like those of the other Galapagos species differently colored. The longitudinal bands are wanting; the sides are vermilion red, and there is a red half-collar on the inferior half of the neck.

As compared with the *T. grayi*, its nearest relative, this species differs in the large size of the lateral scales, in the subdivision of the scales of the muzzle, and in the coloration. The dorsal crest is lower. The females differ in the distribution of the red. In *T. grayi* the sides of the head are red in the female, and in the *T. pacificus* the entire top of the head is rusty red.

It is worthy of notice that in this genus, differently from *Sceloporus*, it is the females that possess the bright colors instead of the males, and that red takes the place of blue on the throat and sides of the belly.

Measurements of ♂.

	Mm.
Total length	190
Length to vent	70
Length to axilla	30
Length to canthus oris	14
Width at canthus oris	14
Length of fore limb	30
Length of fore foot	14
Length of hind leg	51
Length of hind foot	25

Measurements of ♀.

Total length	153
Length to vent	58
Length to axilla	21
Length to canthus oris	10
Width at canthus oris	11

From Chatham Island, Nos. 14945 to 14964.

23. **Tropidurus pacificus** STEINDACHNER.

Abingdon Island, 14966 to 15002.

24. **Amblyrhynchus cristatus** BELL.

Abingdon Island, 14965, 15182–4; Duncan Island, 15176, 15179–81; Hood Island, 15177; James Island, 15178, 15187; Gardner's Island, 15185; Chatham Island, 15186.

14 *bis*. **Opheomorphus chamissonis** WIEGM.

James Island, 15027, 15080.

25. **Testudo nigrita** LESS.

Albemarle Island, 15190–91.

VII. LOWER CALIFORNIA.

18 *bis*. **Phyllodactyles tuberculosus** WIEGM.

26. **Sceloporus zosteromus** COPE.

27. **Uta stansburiana** B. and G. 14896.

28. **Callisaurus dracontoides** DE BL. 14895.

29. **Cnemidophorus tessellatus tessellatus** SAY.

29. **Cnemidophorus tessellatus tigris** B. and G.

30. **Cnemidophorus sexlineatus** LINN.

31. **Chilomeniscus cinctus** COPE.

A living specimen of this species from Tucson, Ariz., preserved in the zoological garden of Philadelphia, was observed by my friend A. E. Brown, the superintendent, to possess extraordinary burrowing powers. It penetrated and traversed soil with almost as great rapidity as it moved on the surface of the ground. 15158.

32. **Pityophis vertebralis** DE BL. 15157.

33. **Bascanium laterale** HALLOW.

A variety without bands, and of a nearly uniform dark brown color. 15135–6.

34. **Crotalus adamanteus atrox** B. and G. 15134.

VIII. PACIFIC COAST OF NORTH AMERICA.

35. **Xantusia riversiana** COPE.

Several adults in fine condition from San Clemente Island. Nos. 15166–75.

36. **Gerrhonotus multicarinatus principis** B. and G.

British Columbia, No. 15194.

SCIENTIFIC RESULTS OF EXPLORATIONS BY THE U. S. FISH COMMISSION STEAMER ALBATROSS.

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No. IV.—DESCRIPTIONS OF NEW SPECIES OF FISHES COLLECTED AT THE GALAPAGOS ISLANDS AND ALONG THE COAST OF THE UNITED STATES OF COLOMBIA, 1887-'88.

BY

DAVID STARR JORDAN AND CHARLES HARVEY BOLLMAN.

In the winter and spring of 1888 the steamer *Albatross* made a cruise from Norfolk, Va., to San Francisco, in the service of the United States Fish Commission.

Extensive collections of fishes were made at various points off the coast of Central and South America. One of the most valuable of this series of collections was that from the region between the Galapagos Islands and Panama. This collection has been placed in our hands for study. In it are found the thirty-one new species mentioned in the present paper. These are described in advance of the appearance of the general report, by the consent of Hon. Marshall McDonald, U. S. Commissioner of Fisheries, and of Mr. Richard Rathbun, assistant in charge of the department of scientific investigation. The following is a list of the species which seem to be as yet undescribed:

- Rajidæ:
  1. Raja equatorialis.
- Torpedinidæ:
  2. Discopyge ommata.
- Dasyatidæ:
  3. Urolophus goodei.
- Synodontidæ:
  4. Synodus evermanni.
  5. Synodus jenkinsi.
- Congridæ:
  6. Ophisoma nitens.
- Ophisuridæ:
  7. Ophichthus evionthas.
  8. Ophichthus rugifer.
- Atherinidæ:
  9. Menidia gilberti.
- Stromateidæ:
  10. Stromateus palometa.
- Serranidæ:
  11. Diplectrum euryplectrum.
  12. Prionodes stilbostigma.
  13. Kuhlia arge.
- Sparidæ:
  14. Xenocys jessiæ.
- Sciænidæ:
  15. Larimus pacificus.
  16. Polycirrhus rathbuni.
- Uranoscopidæ:
  17. Kathetostoma averruncus.
- Gobiidæ:
  18. Bollmannia chlamydes.
- Scorpænidæ:
  19. Scorpæna russula.
- Triglidæ:
  20. Prionotus quiescens.
  21. Prionotus albirostris.
  22. Prionotus xenisma.
- Blenniidæ:
  23. Runula azalea.
- Batrachidæ:
  24. Porichthys nautopædium.
- Ophidiidæ:
  25. Otophidium indefatigabile.
  26. Leptophidium prorates.
- Gadidæ:
  27. Bregmaceros bathymaster.
- Pleuronectidæ:
  28. Azevia querna.
  29. Engyophrys sancti-laurentii.
  30. Symphurus atramentatus.
  31. Symphurus leei.

1. Raja equatorialis sp. nov.

DIAGNOSIS.—Related to *Raja inornata* Jordan and Gilbert, from which it is at once distinguished by having four rows of spines below eyes, a series of stout spines on each side of tail in the male and no prickles on back except the median series and the spine on each shoulder. The size is much smaller (length, 14 inches), it being one of the smallest of the rays.

Type: No. 41,132, U. S. National Museum.

HAB.—Pacific Ocean, off coast of the United States of Colombia. 8° 06′ 30″ N.; 78° 51′ W.

Description.—Disk to posterior base of pectorals one-third broader than long, the breadth exceeding the length by a distance equal to snout and eye; the breadth somewhat longer than length of tail (measured from vent); anterior margin concave in front of eyes. Snout produced at a rather acute angle, its tip rounded, its length from eye $3\frac{3}{5}$ in length of disk. Interorbital space rather strongly concave, its width $2\frac{2}{5}$ in snout. Eye not much larger than spiracles, 3 in snout. Width of mouth $1\frac{1}{2}$ in prenasal part of head; nasal flaps at angle of mouth deeply fringed. Pectorals reaching middle of ventrals, which are as long as from tip of snout to posterior border of spiracle. Claspers in typical example $1\frac{3}{5}$ in disk. Dorsals small, their length 2 in snout. Caudal small, not longer than eye. Snout above, with two rows of spines besides smaller asperities; a row of about 12 before and above eye and spiracle; a row of strong spines along line of back from posterior border of spiracle to second dorsal, these alternately large and small on the tail; a row of similar spines on each side of tail commencing just behind posterior base of ventrals and extending to caudal; a single spine on the shoulder on each side; four or five irregular rows near the anterior margin of the disk opposite the eyes; the length of this patch not as long as snout. Pectorals with the usual strong retrorse spines characteristic of the males of this genus. Small prickles present along the outer anterior margin of pectorals, interorbital area, on top of snout and along its margin for a distance equal to three-fourths of snout and beneath from tip to opposite posterior teeth, the anterior prickles strongest; a small patch in front of eyes. Teeth $\frac{42}{40}$.

Color, light brown, spotted with paler; the back with obscure reticulations of the ground color, forming honey-comb like markings, surrounding paler, an obscure roundish dusky blotch at middle of base of pectorals, and a darker one near their posterior base. Edges of ventrals, pectorals, and snout pale. Dark markings on interorbital area and below eye. No markings below.

This species is known from a single male specimen 14 inches in length dredged at a depth of 33 fathoms, at station 2797, off the west coast of Colombia, between Panama and the Galapagos Islands.

2. Discopyge ommata Jordan and Gilbert sp. nov.

DIAGNOSIS.—Separated from *Discopyge tschudii* by the spiracles having coarse fringes.

Type: No. 41,133, U. S. National Museum.

HAB.—Pacific Ocean off coast of Colombia, 8° 06′ 30″ N.; 78° 51′ W.; also taken by Professor Gilbert at Panama in 1882.

Description.—Disk wider than long by ⅗ interorbal width. Pectorals extending backward covering base of ventrals. Snout broadly rounded, not at all exserted, its length 4½ in length of disk. Eye small, not quite half length of snout. Interorbital space slightly concave, its width 1½ in snout. Spiracle smaller than eye, its margin fringed with 8 to 10 papillæ. Edge of nasal valve vaguely crenulate. Width of mouth 1⅔ in preoral part of head; its anterior margin crenulate; preoral part of snout with distinct pores. Tail from vent to tip of caudal, very slightly shorter than rest of body from vent to tip of snout; a fold of skin on each side of tail extending to opposite posterior margin of first dorsal. Second dorsal narrower and higher than first, its length about equal to snout. Upper margin of caudal equal to snout and eye; its margin like that of dorsal, rounded. Ventrals large, adnate behind, with scarcely any antero-posterior margin.

Color brown, irregularly mottled and spotted with lighter and darker, these markings more pronounced nearer the margins of disk and on sides of tail; center of disk with a large blackish ocellated spot equal to length of snout, the darker center surrounded by a narrow pale circle, a pale spot in the center; snout pale. Posterior edge of pectoral and entire edge of ventrals pale, the lower posterior part of pectorals spotted. Dorsals and caudal pale, marbled with darker.

This species is known from a single female specimen dredged at a depth of 33 fathoms at Station 2795. A specimen was also obtained by Dr. C. H. Gilbert at Panama in 1882. This specimen was destroyed by fire before a description was published.

3. Urolophus goodei sp. nov.

DIAGNOSIS.—Approaching *Urolophus halleri* and *nebulosus*, from which it is separated by the presence of a strong spine on the middle of the back, by the more angular outline, the narrow ventrals, and the plain coloration.

Type: No. 41,150, U. S. National Museum.

HAB.—Pacific Ocean, off coast of Colombia: 8° 06′ 30′ N., 78° 51′ W.

Description.—Disk (to posterior base of pectorals) broader than long by a distance equal to snout and half eye; anterior margins of disk very slightly convex from in front of eyes outwards. Snout with its tip exserted and sharply pointed, its length 3¾ in disk to base of pectorals. Eye about equal to spiracle, 3¼ in snout. Margin of spiracles not denticulated. Interorbital area scarcely concave, its width 2 in snout. Width of mouth 2 in preoral part of head. Nasal fold concave behind, its edge fringed. Ventrals projecting considerably beyond disk, their length (from anterior margin of vent backwards) 1¼ in their breadth. Caudal spine large, its length equal to snout and half eye, its margin with 8–10 sharp forward-projecting spinules; its insertion anterior to middle of tail measured from pectorals, its tip reaching front of caudal. Caudal fin (measured from end of spine) equal to snout and eye. Length of tail greater than that of disk by a distance equal to eye and spiracle. Body (in young specimens) entirely smooth except for the presence of one (or two) sharp spine on middle of back. Color plain brown, paler toward margins of disk; no spots or distinct markings; under side not mottled; caudal dark above, margined with pale.

The above description was taken from a young female specimen 7 inches long. This specimen has the snout wholly smooth. Another about an inch shorter has *two* spines on middle of back and the snout prickly. Both specimens were dredged at Station 2795, with the preceding species. The snout is wholly smooth in the type. We have named this species for Dr. G. Brown Goode, Director of the U. S. National Museum.

4. Synodus evermanni sp. nov.

DIAGNOSIS.—Related to *Synodus poeyi* Jordan, but the snout shorter, the interorbital space broader; the pectorals reaching middle of ventrals, which are 1⅗ in head; coloration, dark above; lining of gill cavity and of shoulder girdle, black.

From other related species the present one may be known by the large size of the scales.

Type: No. 41,144, U. S. National Museum.

HAB.—Pacific Ocean, off coast of Colombia, from 8° 6′ 30″ N., 78° 51′ W., and 7° 57′ N., 78° 55′ W. Stations 2797 and 2795.

Description.—Head, 3⅓ to 3¾ in length; depth, 6½ to 7 (7½–8¼ in total). D. 1, 10; A. 1, 10. Scales, 4–47 to 49–5.

Body terete, rather robust; snout short, rounded rather than pointed, 4 in head. Mouth large; maxillary 1¾ in head. Interorbital area concave, rugose, its least width 5⅖ in head; supraorbital ridge prominent, finely striate.

Origin of dorsal nearer adipose fin than snout by three-fourths width of interorbital area.

Anterior rays of dorsal coterminous with posterior when depressed; the last rays not filamentous; the free edge of the fin little concave; dorsal fin higher than long by nearly an eye's diameter, its length 2⅕ in head. Lower jaw barely projecting. Lateral line with a blunt keel. Tip of ventrals reaching half way to vent (farther in young); their length 1⅗–1⅘ in head. Pectorals extending to near middle of ventrals, 1⅗–1⅘ in head. Lobes of caudal equal.

Color, dark above, pale below; 8 to 10 dusky greenish oblong spots along lateral line; between which and below lateral line are traces of smaller spots. A dusky shade over opercle; skin lining opercle and shoulder girdle dark, the black markings surrounded by yellow. Adipose fin dark, edged with pale; caudal not barred, inner rays dusky; pectorals and dorsal somewhat dusky; other fins pale. Tip of chin scarcely dusky.

This species is known from numerous specimens dredged at a depth of 33 fathoms in Stations 2795 and 2797. The largest are about 8 inches in length.

It is named for Prof. Barton W. Evermann.

5. **Synodus jenkinsi** sp. nov.

DIAGNOSIS—Closely allied to *Synodus scituliceps* Jordan & Gilbert, but the head larger, $3\frac{3}{4}$ in body; ventrals $1\frac{3}{7}$ in head and 6 rows of scales on cheeks.

Type: No. 41,171, U. S. National Museum.

HAB.—Pacific Ocean, off coast of Colombia; Stations 2795 and 2802; 8° 6′ 30″ N., 78° 51′ W., and 8° 51′ (?), 79° 31′ 30″ W.; also from Guaymas.

Description.—Head about $3\frac{3}{4}$ to 4 in length to base of caudal; depth, $6\frac{4}{5}$ to 7. D. 1, 10 or 11; A. 1, 13. Scales, 5–62 to 65–6; 6 rows on cheeks.

Body slender, subterete, depressed. Snout broadly triangular, little pointed, $3\frac{1}{3}$ in head, its length about equal to its breadth at base. Mouth large; maxillary $1\frac{2}{3}$ in head. Interorbital area concave, rugose, slightly broader than eye, $5\frac{1}{2}$ in head; supraorbital, finely striate, with serrulate edge.

Origin of dorsal midway between adipose fin and anterior margin of pupil; free margin of fin concave; anterior rays of dorsal not extending so far as the last when depressed; last ray filamentous and half length of largest; fin higher than long by an eye's diameter.

Lower jaw included; teeth moderate. Lateral line without a keel. Tip of ventrals reaching slightly more than half way to vent; their length $1\frac{3}{7}$ in head. Pectorals reaching root of ventrals, 2 in head, and longer than snout and eye in larger specimens. Upper lobe of caudal the longer, $1\frac{1}{2}$ in head.

Color, brownish olive, white below; scales on back with paler specks; a few rows of scales below lateral line with numerous black dots; head not marbled; jaws not spotted, tip of lower black; inside of opercles dark; lining of shoulder girdle yellow. Pectorals and caudal dusky, former tipped with pale. Adipose fin dark, margined with paler; lower fins pale.

This species is known from numerous specimens, dredged at Station 2797 in 33 fathoms and at Station 2802 in 16. The largest is 13 inches in length. Specimens were also obtained by Jenkins and Evermann at Guaymas. The species is named for Dr. Oliver P. Jenkins.

6. **Ophisoma nitens** sp. nov.

DIAGNOSIS.—Related to *Ophisoma heterognathus* (Bleeker), but with the body (head and trunk) contained $2\frac{2}{3}$ times in tail; eye, 7 in head.

Type: No. ———, U. S. National Museum.

HAB.—Pacific Ocean, off coast of Colombia, 8° 47′ N., 79° 29′ 30″ W.; dredged in 14 fathoms, at Station 2801.

Description.—Head $1\frac{1}{7}$ in trunk, $5\frac{1}{3}$ in tail; interorbital area 2 in the large eye; snout $4\frac{1}{4}$ in head, very soft; eye very large, 7 in head, $1\frac{2}{3}$ in snout; cleft of mouth $3\frac{1}{5}$ in head, extending slightly behind middle of eye; lower jaw considerably shorter than upper.

Body slender; tail compressed, $2\frac{2}{3}$ times as long as head and trunk.

Pectoral long and narrow, $2\frac{4}{5}$ in head, $1\frac{3}{4}$ times as long as gill-slit; dorsal beginning slightly in advance of root of pectoral.

Color olivaceous, upper parts of head and body with numerous fine black dots; a silvery shade across opercles and below lateral line.

Peritoneum bright silvery, giving the belly a pale color. Dorsal and anal with a narrow black margin, below which are a few small spots; pectoral pale.

This species is known from a single young example, 9 inches long, dredged at Station 2801, between the Galapagos and Panama.

7. Ophichthus evionthas sp. nov.

DIAGNOSIS.—Approaching *Ophichthus bonapartii* (Kaup), but having the head, body, and tail covered with numerous round or oval black spots, separated by a yellowish ground-color, and which, at about 15 places, are larger, and tend to form cross-bands.

Type: No. 41,476, U. S. National Museum.

HAB.—Hood Island, Galapagos Archipelago.

Description.—Head $4\frac{3}{4}$ in trunk; about 8 to 10 coarse wrinkles on opercles and throat; snout $4\frac{1}{4}$ in head; eye small, $2\frac{2}{3}$ in snout, much nearer angle of mouth than tip of snout; cleft of mouth $2\frac{4}{5}$ in head, extending slightly beyond eye; lower jaw considerably shorter than upper; teeth small, subequal, acute, recurved, all except anterior vomerine uniserial.

Body rather stout; tail very slightly longer than trunk.

Pectoral quite small, $9\frac{1}{2}$ in head, equal to eye, and slightly shorter than gill-opening; dorsal beginning about twice length of pectoral behind tip of latter.

Color, light olive, the entire body covered with numerous round or oval black spots, which are separated by a yellowish ground-color, at intervals. In about 15 places these spots are considerably enlarged, tending to form dusky cross-bands. At these points the spots extend farther down on the belly; spots most numerous and smallest on head, especially across jaws, behind angle of mouth, and across opercles; those which tend to form cross-bands on body and tail are the largest, especially the lowermost, which are brownish and more diffused; an irregular series along middle line of belly, this becoming a double series along base of anal; lower side of head profusely spotted.

Pectoral with two obscure spots on its anterior side; dorsal with 3 or 4 rows of spots, those of the upper row elongate; anal pale, the row of spots along each side extending slightly on fin.

This species is known from a single specimen, 19¼ inches long, taken at Hood Island. It is a female, full of eggs.

8. Ophichthus rugifer sp. nov.

DIAGNOSIS.—Closely allied to *Ophichthus triserialis* (Kaup), but differing as follows: Gill-opening, 2¾ in the long pectoral, which is 2⅔ in head; dorsal beginning over middle of pectoral; head and entire body corrugated; no black occipital band; dorsal with a submarginal row of spots; anal pale; spots on under part of head not distinct; a dark shade extending from gular region across opercles. In other respects it agrees fully with the description of *O. triserialis*, as given in Jordan & Gilbert, Synopsis Fishes of North America, p. 359.

Type: No. 41,428, U. S. National Museum.

HAB.—Charles Island; Galapagos Archipelago.

Description.—Head, 2¾ in trunk; eye, 3⅔ in gape, 1½ in snout; gape, 2⅗ in head; tail, more than ⅓ longer than head and body; teeth, small, acute, biserial in both jaws and on front of vomer.

Color light olive, a row of rather large, round spots along lateral line; a series of smaller spots on each side above the lateral series and alternating with it; a row of submarginal spots on the dorsal fin, irregularly alternating with the second series. Top and sides of head with smaller spots; a dusky shade near the middle of each pectoral; lower parts pale except the jaws and throat.

This species is known from a single female example, 21½ inches in length, taken at Charles Island.

9. Menidia gilberti sp. nov.

DIAGNOSIS.—Distinguished from *M. pachylepis* and *guatemalensis* (Günther) by the much smaller scales.

Type: No. 41,165, U. S. National Museum.

HAB.—Panama.

Description.—Head, 4⅔–4⅘ (5⅓–5⅔ in total); depth, 5⅓–5⅔ (6⅓–6⅖). D. VI–I, 9; A. I, 21 or 22. Scales, 4–48 or 49–4. Length, 4¼ inches.

Body rather slender, elongate, compressed, especially below. Head short, its upper surface slightly convex. Snout larger than eye, 3 to 3⅓ in head. Maxillary, 1½ in snout. Lower jaw included. Eye moderate, 3 to 3½ in head, 1⅙ to 1¼ in interorbital space. Teeth in jaws small, not close set, none on vomer or palatines. Gill-rakers long and slender, about 20 developed below angle.

Origin of first dorsal midway between posterior margin of head and base of caudal, its posterior margin opposite front of anal. Its longest spine 4⅕ in head. Insertion of second dorsal midway between base of caudal and fifth scale in front of first dorsal, opposite middle of anal, its longest ray equal to snout. Distance between origin of second dorsal and base of caudal equal to a distance from tip of snout to two-thirds an eye's diameter beyond upper angle of pectorals. Origin of anal midway between base of caudal and posterior base of pectorals, the base equal to distance from tip of snout to base of pectorals; longest ray equal to snout and eye. Pectorals reaching beyond origin of ventrals, $1\frac{1}{7}$ to $1\frac{1}{6}$ in head. Ventrals reaching half way to vent, $1\frac{5}{7}$ to 2 in head, their origin midway between front of anal and edge of preopercle. Vertical fins nearly or quite scaleless. Scales large and firm; those above with the edges distinctly crenate.

Color greenish, the back rather pale, the scales thickly dusted with brown dots; a narrow vertebral band, which is anteriorly accompanied by a short line on each side; this band is broadest posteriorly. A bluish-silvery lateral band, bordered by dark above, upper parts dotted with black; sides and belly paler than back, the upper two rows of scales below lateral band anteriorly with a few dots.

Tip of snout, head between eyes, and Λ-shaped area on top of head, dark; from the occipital mark a streak of dots extend to base of pectorals; only a few dots on top of opercles; lower jaw dusky; lining of opercle dark; fins all pale.

Of this species numerous specimens, the largest about $4\frac{1}{4}$ inches long, were obtained by the *Albatross* at Panama. Numerous specimens were also obtained at Panama in 1882, by Dr. Gilbert, for whom we have named the species.

The species lately described from Guaymas, by Jenkins and Evermann, under the name of *Atherina sardina*, is also a *Menidia*, and should stand as *Menidia sardina*.

10. **Stromateus palometa** sp. nov.

DIAGNOSIS.—Allied to *Stromateus medius* Peters, but distinguished by the greater number of dorsal and anal rays (D. III, 45 to 47: A. III, 45), and by its larger head. (Head $2\frac{3}{4}$ to 3 in length.)

Type.—No. 41,136, U. S. National Museum.

HAB.—Pacific Ocean, off coast of Colombia: 8° 16′ 30″ N., 79° 37′ 45″ W. Station 2804.

Description.—Head $2\frac{3}{4}$ to 3; depth 2. D. III, 45 to 47; A. III, 45. Length of type, $2\frac{3}{4}$ inches. Body ovate, compressed, rather deeper than in *S. triacanthus;* ventral outline most arched; profile evenly convex to nostrils, where it abruptly descends, rendering the snout very blunt. Mouth small; maxillary reaching middle of pupil, 3 in head. Jaws equal. Teeth comparatively long, slender, and close-set, especially in the lower jaw, where they form an even cutting edge. No teeth evident on vomer or tongue. Snout shorter than eye, $4\frac{1}{2}$ in head. Eye rather large, 3 to $3\frac{1}{2}$ in head (young). Gill-membranes entirely separate. Gill-rakers long and slender, the longest about half eye, about 17 developed below angle. Dorsal and anal spines subequal, the longest not half eye; distance from tip of snout to first soft ray of dorsal less than depth of body by two-thirds diameter of eye. Base of anal slightly shorter than base of dorsal (perhaps longer in the adult). Pectorals as long as head. No trace of ventrals, the pubic bone ending in a sharp spine; the usual antrorse spines before dorsal. Region above lateral line without evident pores. Greatest width of head $2\frac{1}{2}$ in its length; cheeks scaly; opercle naked; body covered with very small scales.

Color, silvery, bluish above; body with numerous small black dots, which are most numerous along bases of fins, caudal peduncle, top of head, and snout, and largest along base of anal. Vertical fins covered with small black dots, those on dorsal and anal larger than those on caudal. Pectorals dotted.

Numerous specimens of this species, the largest $2\frac{3}{4}$ inches long, were dredged in station 2804, at a depth of 47 fathoms.

11. **Diplectrum euryplectrum** sp. nov.

DIAGNOSIS.—Allied to *Diplectrum radiale* and *D. macropoma*, distinguished from the former by having the fascicle of preopercular spines much wider, wider than eye; from the latter by having smaller scales, those on cheeks in 8 or 9 rows.

Type.—No. 41,141, U. S. National Museum.

HAB.—Pacific Ocean, off coast of Colombia, from 8° 06′ 30″ N., 78° 51′ W., and 7° 57′ N., 78° 55′ W., 7° 56′ N., 79° 41′ 30″ W., stations 2797, 2795, 2805. Head (to end of opercular spine) $2\frac{2}{3}$ to $2\frac{3}{4}$ ($3\frac{1}{3}$ to $3\frac{1}{2}$); depth $3\frac{2}{5}$ to $3\frac{1}{2}$ ($4\frac{1}{3}$ to $4\frac{1}{2}$). D. X, 12; A. III, 8. Scales 8–50 to 55–18.

Description.—Body moderately elongate, heavy through shoulders; the back not much elevated; anterior profile convex, nearly straight above eyes; mouth large, maxillary reaching posterior border of eye, 2 in head; snout blunt, $3\frac{3}{4}$ in head; eye large, slightly shorter than snout, 4 in head. Interorbital space appearing slightly concave, $1\frac{2}{3}$ in eye. Teeth as in *D. radiale.* Preopercular process very wide, its width $1\frac{1}{4}$ times diameter of eye; spines long and slender, 15 to 20 developed; the lower angle not so strongly projecting as in *D. macropoma.* Opercular spine rather sharp, embedded. Gill-rakers rather long, stout as inother species, X + 12. Scales small, rather firm; smaller than in other species; 8 or 9 rows on cheeks; scales on opercle smaller than in *D. radiale* or *D. macropoma.*

Dorsal spines weak, pungent; second $1\frac{3}{5}$ in third; fourth and fifth almost equal, $3\frac{1}{8}$ in head; first soft ray 3 in head, shorter than next the last. Upper lobe of caudal longest, $1\frac{2}{5}$–$1\frac{3}{5}$ in head, lower lobe $1\frac{2}{5}$–$1\frac{4}{5}$ in head. First anal spine $1\frac{4}{5}$ in second, which is strongest and $1\frac{1}{2}$ in third, latter 5 in head; soft rays showing a convex margin; the longest $3\frac{6}{7}$ in head. Pectorals broad; their posterior margin truncate-concave, their length $1\frac{5}{9}$ in head. Ventrals $1\frac{5}{7}$ in head. Color, brownish above, as in *D. radiale*, becoming more yellowish and silvery below; sides with about 5 pairs of interrupted black bars; a large black blotch at base of caudal. Markings on preorbital and cheeks rather indistinct; a large black spot above preopercular angle on opercle; lips bluish. Spinous dorsal dusky above; a small pale spot under tip of spines; soft dorsal plain olive, dark at base; inner rays of caudal tipped with dusky, a few lower rays pale; pectoral and anal pale; ventrals dusky.

This species is known from numerous specimens dredged by the *Albatross* at stations 2795 and 2797, at a depth of 33 fathoms, and at station 2805 at a depth of 51½ fathoms. The largest of these is about 7 inches long.

Taken with this species is another equally abundant and very closely related, distinguished chiefly by the larger scales. This seems to be *Diplectrum macropoma* (*Centropristis macropoma* Günther), originally described from Panama. The third species of this type, *Diplectrum radiale*, was obtained by the *Albatross* at Panama. In this species the breadth of the fascicle of preopercular spines is notably less, while in the fourth species, *D. formosum*, this fascicle is, in the adult, divided into two.

12. Prionodes stilbostigma sp. nov.

DIAGNOSIS.—Allied to *Prionodes luciopercanus* (Poey), but the coloration entirely different, and the body deeper.

Type.—No. ——, U. S. National Museum.

HAB.—Pacific Ocean, off the coast of Ecuador, 0° 50′ S., 89° 36′ W.; depth, 45 fathoms; station, 2809.

Description.—Head 3 (3⅔) in length; depth, 3⅔ (4⅗); D. X, 12; A. III, 7. Scales, 8–58–18.

Length of type, 7¼ inches.

Body elongate-elliptical, less slender than in *P. luciopercanus;* back not much elevated; anterior profile straight from tip of snout to front of dorsal. Snout sharp, 3½ in head, lower jaw considerably projecting, mandible 3½ in head. Mouth rather large; maxillary reaching nearly to middle of pupil, $2\frac{4}{7}$ in head. Eye large, a little shorter than snout, 4 in head. Interorbital space very slightly concave, ridged. Teeth small, anterior teeth of front row in both jaws slightly enlarged; posterior teeth of lower jaw also enlarged; vomerine teeth in a Λ-shaped patch. Preopercle finely serrate, the lower teeth a little coarser, the margin evenly rounded. Opercle ending in three spines of which the middle one is considerably the largest; membrane extending beyond spines. Gill-rakers moderately long and slender, about 9 developed.

Scales small, firm, ctenoid; 11 rows on cheeks; 11 vertical rows on opercle to base of spines; 2 rows on interopercle.

Spinous dorsal rather low, not notched; first spine about 1½ in second, fourth very slightly longer than third, as long as from tip of snout to middle of eye, 2½ in head; soft dorsal not elevated, first ray 2¾ in head. Upper lobe of caudal the longer, 1⅖ in head; lower lobe, $1\frac{5}{7}$ in head. Second anal spine strongest, hardly as long as third, which is 3⅔ in head; first, $1\frac{3}{7}$ in second; first anal ray, 3 in head; penultimate longest, 2⅕ in head; last somewhat shorter. Pectorals pointed, 1⅕ in head, reaching beyond tips of ventrals to vent. Ventrals 1⅔ in head. Soft dorsal and anal with a few scales. Scales on breast and belly small.

Color reddish (probably crimson in life), becoming paler beneath, breast somewhat orange. A few small, round, pale spots on cheeks and opercles; occiput rather dark; lower jaw dusky; a slight bluish shade on preorbital. Anterior part of back with small indistinct light and dark specks; large, quadrate, inky-black spot larger than eye at base of soft dorsal, which involves the basal half of several rays, and extends downward almost to lateral line; in this blotch are traces of three darker spots; behind this, three much smaller, roundish, black spots, which extend on fin; below these a row of about 10 round black spots smaller than pupil, on median line of side extending from opposite front of large dorsal spot to base of caudal; below this series some fainter irregular spots of black; extending obliquely upwards and backwards from above tip of ventral fin to lateral line a large elliptical creamy or silvery blotch which is about as wide as interorbital and as long as snout and eye; this spot does not reach middle line of belly. Spinous dorsal with three rows of diffuse, confluent, black spots separated by pale streaks; soft dorsal marked with several black spots, which extend upward from body; above these a pale median longitudinal streak. Upper half of caudal red, with a few small black spots, lower lobe inky-black, with some pale edgings. Outer half of ventrals and anal dusky. Pectorals pale.

A single specimen was dredged at 45 fathoms at Station 2809, off the coast of Ecuador. It is a very interesting species, allied to *Prionodes luciopercanus*, but quite peculiar in color, having, among other things, the peculiar oblique cream-white band found in *Prionodes phœbe* and *P. brasiliensis*.

13. Kuhlia arge sp. nov.

DIAGNOSIS.—Closely allied to *Kuhlia tæniura* (Cuvier and Valenciennes), an East Indian species, from which it is distinguished by its smaller eye, which is 3⅓ to 3½ in head.

Type: No. 41,169, U. S. National Museum.

HAB.—Chatham Island, Galapagos Archipelago.

Description.—Head 3½ to 3¾ (4½ to 4⅘); depth 2⅔ (3½); D. IX–I, 11 A. III, 11. Scales 7–50 to 52–12. Length of type 6 inches. Body oblong, strongly compressed; back elevated above pectorals; the anterior profile straight and rather steep; caudal peduncle long, compressed. Mouth rather small, very oblique, the lower jaw considerably projecting; maxillary reaching anterior margin of pupil, 2⅔ to 2¾ in head. Eye moderate, slightly longer than snout, 3⅗ in head. Teeth very small, in narrow bands, those on vomer in a Λ-shaped patch. Preorbital very narrow, its edge anteriorly with strong retrorse serræ, the moderately broad maxillary not sheathed by it. The structure in this regard resembles that of *Serranidæ*, not that of *Sparidæ*. Least width of preorbital 3½ in eye. Serræ of preopercle sharp and fine, well developed below angle. Gill-rakers long and slender, about X + 21. Scales rather small, ctenoid, firm, 3 or 4 rows on cheeks, 2 rows on interopercle. Jaws, snout, and top of head naked. Opercle with two strong spines, the lower the larger and nearly as long as pupil. Lateral line anteriorly rather sharply curved upward, concurrent with the back. No accessory ventral scale. Nostrils very small, round, close together. Dorsal spines high and pungent, hardly flexible, the first half as long as the second, the fifth longest, 1⅔ in head, reaching tip of eighth when depressed. Dorsal fins very slightly connected by membrane. Soft dorsal 1⅔ in anal, first ray 2 in head. Caudal deeply forked, as long as head, its inner rays not quite half as long as outer. First anal spine 1⅗ in second, which is strongest and equal in length to third; free margin of anal slightly concave, first soft ray 2¾ in head. Pectorals short, pointed, 1⅗ to 1½ in head. Ventrals moderate, reaching vent, 1⅗ in head. Soft dorsal and anal free from scales; a scaly sheath along base of both dorsals.

Coloration, bluish above, sides brilliant silvery; soft dorsal with a black oblique bar across its anterior rays; median rays of caudal black, lobes tipped with white, and crossed by two oblique black bars, which are separated by cream-colored bands, which are brightest on inner rays; outer bar largest. In other words, caudal with two black and three white cross-bands on each lobe, these convergent backwards; lower fins pale; axil of pectoral dusky on the inner side.

In spite of the resemblance of *Kuhlia* to *Xenistius*, the former is evidently Serranoid, the latter Sparoid in its affinities.

Several specimens of this beautiful fish were obtained by the *Albatross* at Chatham Island, in the Galapagos. This species is exceedingly close to the East Indian *K. tæniura*, scarcely differing from Bleeker's description of the latter except in the smaller size of the eye.

Xenocys* gen. nov.

DIAGNOSIS.—Closely allied to *Xenistius*, Jordan and Gilbert, from which it differs, in having the dorsal fins entirely separated, the spinous part of nine species, its base containing that of soft dorsal 1½ times; nostrils smaller and closer together than in *Xenistius;* teeth smaller; the fins more densely scaled and the occipital crest lower.

Type.—*Xenocys jessiæ* Jordan and Bollman.

14. **Xenocys jessiæ** sp. nov.

Type: No. 41,166, U. S. National Museum.

HAB.—Charles Island, Galapagos Archipelago.

Head, 3½ (4½); depth, 3⅔ (4⅔). D. X-I, 13; A. III, 11. Scales, 8–51–15. Length of type, 8½ inches.

Description.—Body narrowly but regularly elliptical, compressed; back little elevated. Mouth rather large, somewhat oblique; lower jaw somewhat projecting; maxillary rather broad, reaching nearly to middle of pupil, $2\frac{3}{7}$ in head Eye large, its diameter greatest obliquely downward and backward; equal to snout, $3\frac{2}{5}$ in head; longitudinal diameter shorter than snout, $3\frac{4}{5}$ in head. Preorbital rather narrow, its narrowest place $2\frac{2}{3}$ in eye; its edge entire, sheathing the edge of the maxillary for its whole length. Teeth very small, bands wider than in *Xenistius californiensis;* those on vomer in a Λ-shaped patch, but very small. Nostrils minute, close together, the anterior round, the posterior oblong. Serræ of preopercle at angle blunt, rather flat, none below, those on ascending limb smaller and sharper. Gill-rakers long and slender, about X+23. Opercle without spines. Cheeks and top of head with small scales; lower jaw and snout with rudimentary scales; maxillary naked. Scales small, firm, ctenoid. Dorsal fins entirely separate, the interval between them about $\frac{4}{5}$ diameter of eye. Dorsal spines rather high, slender, and pungent; the first short, the third and fourth of equal length, 2 in head, reaching when depressed to the tip of eighth; the second $\frac{2}{3}$ of third. Soft dorsal longer than anal, its base about $\frac{4}{5}$ of an eye's diameter shorter than that of spinous dorsal. Second anal spine noticeably shorter than third, which is almost 4 in head; longest soft ray $2\frac{6}{7}$ in head. Soft dorsal, anal, and base of ventrals closely covered with small scales. Caudal deeply forked, its peduncle slender, its upper lobe $1\frac{1}{7}$ in head. Pectorals long, pointed, $1\frac{2}{5}$ in head; ventrals reaching slightly more than three-fifths distance to vent, $1\frac{3}{5}$ in head; axillary scale of ventrals well developed.

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* *ξενός* strange; *οκύς* swift.

Color grayish-black above, silvery below, with about 7 distinct, black, straight, parallel stripes on back and sides which extend across opercles and cheeks, those above lateral line indistinct in old specimens. The upper stripes are about as wide as the interspaces, the lower narrower; top of head with distinct stripes; fins dusky, except the ventrals.

Numerous specimens of this beautiful and most graceful fish were obtained at Charles Island. The species is named for Mrs. Jessie Knight Jordan.

15. Larimus pacificus sp. nov., (*Larimus breviceps* of authors, from the Pacific coast).

DIAGNOSIS.—Separated from the Atlantic species *Larimus breviceps* Cuvier, by the shape of the mouth, which is less oblique and similar to that of *L. fasciatus*, by the small anal spine, 3 in head, and by the distance between origin of ventrals and anal, which is more than depth of body, so that the ventrals do not reach vent.

Type.—No. 41,168, U. S. National Museum.

HAB.—Pacific Ocean, off coast of Colombia. Station 2802: 8° 38′ N., 79° 31′ 30″ W. Also taken at Panama, Punta Arenas, and Mazatlan.

Description.—Head, 3 ($3\frac{3}{4}$); depth same; D. X–I, 27; A II, 6. Scales, 6–50–8. Length of type, $5\frac{1}{2}$ inches.

Body compressed, formed as in other species; back elevated, regularly rounded from snout to last dorsal ray; ventral outline most arched anteriorly, base of anal oblique. Profile of head depressed very slightly before dorsal and above eyes. Snout short, 4¾ in head. Eye moderate, equal to width of interorbital, 4 in head. Mouth rather large; maxillary reaching posterior border of eye, 2⅕ in head. Premaxillary opposite middle of pupil. Width of preorbital one-third eye.

Pores of snout and chin as in other species of *Larimus*.

Preopercle with a narrow, crenulate, membranous border; scapular scale with well-developed membranous teeth; opercle, with three graduated, stiff, membranous spines above and another below. Gill-rakers, long and slender, longest equal to length of eye; about 20 developed below angle.

Scales on head and anterior part of breast cycloid; bases of membranes of fins scaly. First dorsal spine inserted over base of pectorals; fourth spine longest, 2½ in head. Anterior and posterior soft rays of dorsal subequal, 3 in head. Second anal spine, 3 in head; second anal ray, 2½ in head. Distance between origin of ventrals and anal one-fifth more than depth of body. Pectorals 1¼ in head, reaching anus. Ventrals not reaching vent by almost half eye, 1⅖ in head.

Coloration essentially similar to that of *Larimus breviceps*, silvery, with confluent dusky spots forming dark streaks along the rows of scales; numerous black dots from snout to caudal below lateral line; opercle appearing dusky externally, because the skin lining the region around pseudobranchiæ is inky black; dorsal, caudal, anal, and pectorals somewhat dusky; soft dorsal pale at base, then with a dusky and a pale longitudinal streak, the distal half dusky; general coloration less yellow than in *breviceps* and the streaks along scales more prominent.

The specimens referred by us to *Larimus breviceps* were taken by the *Albatross* at the island of St. Lucia. The type of the present species was dredged in 16 fathoms at Station 2802, between the Galapagos Islands and Panama.

Other specimens apparently of the same species have been taken by Dr. Gilbert at Mazatlan, Punta Arenas, and Panama.

16. **Polycirrhus rathbuni** sp. nov.

DIAGNOSIS.—Related to *Polycirrhus peruanus* (Steindachner), from which it is separated by its shorter pectoral (1⅔ to 1¾ in head), shorter dorsal spines (longest, 2⅓ in head), longer snout (3¾ in head), and more dorsal rays (D X–I, 29–30); a large black humeral spot.

Type.—No. 41,170, U. S. National Museum.

HAB.—Panama.

Description.—Head 3½ (4⅗); depth, 3⅖ (4¼). D. X–I, 29–30; A. II, 9. Lateral line, 53–55. Length of type, 7 inches.

Body elongate, compressed; back elevated, profile from snout to dorsal straight or slightly S-shaped; ventral outline gently arched, base of anal oblique; caudal peduncle short and compressed.

Head low, little compressed. Snout short and blunt, 3¾ in head.

Mouth small; maxillary slightly longer than in *peruanus*, reaching pupil, 3 in head. Eye shorter than snout, $4\frac{1}{2}$ in head. Teeth small, villiform, outer enlarged, those of upper jaw largest.

Preopercle with a crenulate membranous border; least width of preorbital 6 in head. Gill-rakers short and rather thick; 5+10 present, lower much smaller.

Scales on snout, below eyes, and on anterior part of breast, cycloid; caudal scaly; dorsal and anal nearly scaleless, with a scaly sheath at base.

First dorsal spine very short, inserted over base of pectorals; third and fourth equal, $2\frac{1}{3}$ in head. Anterior dorsal rays 3 in head, posterior $2\frac{1}{2}$. Second anal spine 3 in head, longest ray, 2. Distance between bases of ventrals and anal, 3 in body. Pectorals not extending beyond ventrals, $1\frac{2}{3}$ to $1\frac{3}{4}$ in head. Ventrals not reaching vent, $1\frac{2}{7}$ to $1\frac{2}{5}$ in head, outer ray filamentous. Longest caudal ray $1\frac{1}{7}$ in head, fin shaped as in *peruanus*, the median rays longest, the upper lobe slightly truncate and slightly concave, the lower cut off still more obliquely.

Color bluish-silvery, more yellow beneath; scales from base of pectorals to caudal with larger dots. Back with four or five very faint broad dusky cross-bands, the one at end of spinous dorsal largest; a black spot larger than eye near origin of lateral line. Membrane of spinous dorsal thickly dusted; soft dorsal with a pale streak through its middle. Anal, outer half of ventrals, and nearly all of pectorals dusky; caudal rusty at base, followed by a pale area and then a dusky one.

Several specimens of this species were obtained by the *Albatross* at Panama. It is named for Mr. Richard Rathbun of the U. S. Fish Commission.

√ 17. Kathetostoma averruncus sp. nov.

DIAGNOSIS.—Allied to the Australian species *Kathetostoma læve*, differing in the smaller number of dorsal rays and perhaps in coloration.

Type: No. ——, U. S. National Museum.

HAB.—Pacific Ocean, off coast of Columbia; 8° 57′ N., 79° 31′ 30″ W. (Station 2800).

Description—Head, $2\frac{2}{3}$ $(3\frac{1}{3})$; depth, $3\frac{3}{4}$ $(4\frac{1}{2})$. D. 13; A. 13. Length of type, $4\frac{1}{2}$ inches.

Body short and robust, its width behind base of pectorals equal to length of top of head. Head very large, its width at preopercle less than its length by half length of eye. Mouth large, vertical; maxillary 2 in head. Snout $1\frac{2}{5}$ in eye. Eye rather small, 5 in head. Teeth of lower jaw largest, inner row of both jaws enlarged and movable. Lower jaw without tentacle. Interorbital space slightly concave, $1\frac{1}{2}$ times length of eye. Premaxillary groove as broad as long, $1\frac{1}{2}$ in eye; obtuse behind, extending backward just past middle of pupil. Distance between bases of humeral spines $1\frac{1}{4}$ in top of head. Preorbital with three spines in front directed forward and downward. Preopercle with three spines below angle directed downward and forward. Two antrorse spines on mandible, and two on breast before ventrals. Bones of top of head coarsely granular, striate, no naked area above except premaxillary groove; two points on occipital region whence granular ridges radiate; opercles and orbital bones coarsely granular, but not striate. No trace of scales or of spinous dorsal. Base of dorsal equal to base of anal, $1\frac{2}{5}$ in head; longest ray equal to depth of cheeks. Pectorals half eye, length greater than that of top of head. Ventrals reaching more than half way to vent, their length equal to that of top of head.

A few small depressions resembling imbedded scales on region before dorsal and above head.

Color, blackish-brown, mottled with paler; lower parts pale, dusted with brown; lips and gular region black. Dorsal dusky, with five indistinct, partly confluent, whitish spots along its base. Anterior part of anal pale, posterior thickly dusted with blackish, tips of rays pale. Pectorals blackish, faintly barred; axil dusted outside, inner part very pale. Ventrals pale. Caudal with three irregular oblique dark bars. Floor of mouth pinkish; tongue dusted with dark specks.

A single specimen of this remarkable form was dredged at Station 2800, at a depth of seven fathoms.

18. **Bollmannia** Jordan gen. nov.

DIAGNOSIS.—This new genus differs from *Lepidogobius* by having no fleshy processes on inner edge of shoulder girdle, the interorbital area narrower and without trace of median keel, and by the very large ctenoid scales. From *Gobius* proper it is distinguished by the presence of 7 dorsal spines and by the presence of large scales on the cheeks.

I have named this genus in honor of my late colleague, Mr. Charles Harvey Bollman, whose untimely death while engaged in the exploration of the rivers of Georgia, took place while this paper was passing through the press.—D. S. J.

18. **Bollmannia chlamydes**[*] Jordan, sp. nov.

Type: No. 41,158, U. S. National Museum.

HAB.—Pacific Ocean off coast of Colombia; Station 2800, 8° 51′ N., 79° 41′ 30″ W.; and Station 2805, 7° 56′ N., 79° 41′ 30″ W.

Description.—Head $3\frac{1}{2}$ (5 to $5\frac{1}{2}$); depth $4\frac{1}{2}$ ($6\frac{2}{3}$ to 7). D. VII, 15; A. 15. Scales in a longitudinal series about 28; 8 or 9 in a cross-series at vent. Length of type $4\frac{3}{4}$ inches. Body rather robust, compressed. Head large and heavy, its profile evenly curved. Mouth very large, oblique; the lower jaw projecting; maxillary reaching to opposite pupil, $2\frac{1}{5}$ to $2\frac{2}{7}$ in head. Teeth small, sharp, in several series, the outer, especially in lower jaw, somewhat enlarged. Eye longer than snout, $3\frac{3}{4}$ to 4 in head. Interorbital area very narrow, concave, its least width about one-third of eye or almost equal to pupil. Scales very large, ctenoid; little reduced on breast and nape; about 8 before dorsal, where they are little smaller than on body; top and sides of head with large scales; scales on cheeks in four rows; two rows on upper part of opercles. The scales on head lost in some of the specimens. Dorsal spines slender, filamentous, fifth longest, 1⅙ in head; first 2 in head, last 3½ to 4. First soft dorsal ray 2⅗ in head, the ante-penultimate longest and about equal to head. First anal ray equal to snout, the ante-penultimate 1¼ in head. Middle caudal rays very long, somewhat more than half length of body. Pectorals 1⅕ in head. Ventrals 1⅓.

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[*] Χλάμυδης=cloaked.

Color, olivaceous, darkest above; scales with a few black dots, some of the posterior occasionally dark-edged. Sides with 8 to 10 obscure dusky vertical bars, which are narrower than the interspaces and in some specimens wholly obsolete. Snout bluish; opercles with a dark shade; lips, gular region, and anterior branchiostegals very dark in males. Upper part of spinous dorsal darkest, with a few lighter dark-edged oval spots, a well-marked black blotch between last two spines; soft dorsal dusky, usually with about three well-developed rows of lighter, dark-edged oval spots. Anal dusky, crossed by two narrow bluish streaks. Some of the last rays occasionally have a few spots similar to those on dorsal. Caudal, pectorals, and ventrals dusky, tinged with blue; ventrals edged with pale.

Many specimens of this abundant species were dredged at Station 2800 in seven fathoms and in Station 2805 in fifty-one and one-half fathoms.

19. Scorpæna russula sp. nov.

DIAGNOSIS.—Allied to *Scorpæna fernandeziana* Steindachner and *Scorpæna sonoræ* Jenkins & Evermann. It is distinguished from the former by its naked opercles and pale ventrals and anal, from the latter by having no coronal spines; the maxillary 2 in head and no large black spots on spinous or soft dorsals.

Type: No. 41,160, U. S. National Museum.

HAB.—Pacific coast of Colombia, Stations 2797 and 2795, 8° 6′ 30″ N., 78° 51′ W., and 7° 57′ N., 78° 55′ W.

Description.—Head 2⅓ to 2½ (3 to 3⅙); depth 3⅕ to 3⅓ (4 to 4¼). D. XI, I-10; A. III-5. Lateral line, 45 to 47. Length of type, 6 inches.

Body robust, compressed; back little elevated, profile very gently arched from snout to origin of spinous dorsal. Mouth large; maxillary reaching posterior margin of pupil, 2 in head. Snout 4½ in head. Eyes large, 3½ in head. Interorbital space narrow, concave, its width a little less than one-third eye. Occipital and suborbital pits absent. Gill-rakers short and thick, 5 or 6 developed.

Nasal spines short and sharp, not longer than length of nostrils. Preocular spine very prominent, larger than others on top of head. Supraocular spine not so strong as postocular and tympanic, which are close together, the latter followed by a low striate ridge which bears the low occipital and nuchal spines. No coronal spines.

Temporal ridge prominent, ending in a spine, and with two blunt spines in front; below these, and about half way to suborbital stay, is another small and blunt spine. Preorbital with two large forward projecting spines in front; suborbital stay with a prominent ridge which bears a small spine below anterior margin of pupil, and two more behind posterior margin (in the young the first of these two is absent). Preopercle with four distinct spines, besides some four smaller projections, the largest spine with a small one immediately below. Opercular spines two, large and sharp, the lower the longer.

Scales small, scarcely ctenoid, those on belly much reduced; breast and region in front of pectorals and ventrals scaled; antedorsal region with 3 or 4 rows of imbedded scales; temporal region with a few imbedded scales; cheeks with about 4 rows of large scales below the suborbital stay; membrane of opercles with a few scales, the opercle itself naked. Scales of body without fleshy flaps. Supraorbital tentacle developed in the young, disappearing in the adult. Dorsal spines not as high as soft rays, the fin deeply notched; first spine 2 in eye, second $1\frac{2}{5}$, third almost equal to eye, fourth and fifth almost equal, 3 in head, twelfth $3\frac{1}{4}$ in head. Longest soft ray of dorsals $2\frac{1}{2}$ in head. First anal spine $2\frac{1}{4}$ in second or 2 in eye, second anal spine longer than third and equal to eye; longest soft ray equal to that of dorsal. Pectorals long. $1\frac{1}{2}$ in head. Ventral reaching vent, very slightly more than 2 in head, Caudal equal to pectoral.

Color, dark brown above, probably crimson in life, pale below level of upper half of pectorals. Upper half of head dark but without any distinct spots, the back more or less mottled with dusky. Spinous dorsal with a dusky band at base and another across its middle; soft dorsal dark at base and with three or four irregular rows of small, obscure brownish spots. Caudal tipped with black, traces of a narrow dark bar across its middle. Pectorals slightly tipped with black, the middle slightly mottled. Ventrals and anals pale or with traces of black on tips of rays.

Numerous specimens were dredged at a depth of 33 fathoms in Stations 2795 and 2797.

20. **Prionotus quiescens** sp. nov.

Diagnosis.—Related to *Prionotus stephanophrys* Lockington, but the interorbital area concave; the bones of head much striate and granulated, and the caudal differently colored. It also bears some resemblance to the Atlantic species *Prionotus stearnsi.*

Type: No. 41,153, U. S. National Museum.

Hab.—Pacific Ocean off coast of Colombia; from Station 2800, 8° 51′ N., 79° 31′ 30″ W.; Station 2805, 7° 56′ N., 79° 41′ 30″ W.; Station 2801, 8° 47′ N., 79° 29′ 30″ W.; and Station 2802, 8° 38′ N., 79° 31′ 30″ W.

Description.—Head 2½ to 2¾ (3⅕ to 3⅓ with caudal); depth 4 to 4½ (5 to 6). D. X–12; A. 11. Scales, in lateral line, 50 to 55; in a longitudinal series, 60 to 70. Length of types about 5 inches. Body rather slender, compressed, not much narrowed above, the width of the nape between the occipital spines 4 to 4⅕ in head. Head moderately elongate, not elevated; eyes not prominent, the profile from snout to nape almost straight or slightly convex. Snout broad, of about equal length and breadth, 2½ to 2⅔ in head; anterior margine marginate; preorbital little projecting, its edge with about 15 to 20 fine serræ, the anterior strongest with the exception of the last one, which is directed backwards.

Surface of bones of head smoother than usual in this genus and with fine radiating granular striæ, those on opercles, cheeks, and top of head most strongly developed.

Mouth rather large, maxillary 2½ in head, reaching slightly beyond anterior orbital rim.

Band of palatine teeth narrow. Eye moderate, 4⅓ to 5 in head. Orbital rim not especially elevated, its edges granulated, especially anteriorly, preorbital and postorbital spines small and blunt. Interorbital not deeply concave, rather wide, its least width 4⅔ to 5 in head. No groove across top of head behind orbital rim. Occipital ridges present, the inner very low, ending in a very small spine; outer large, ending in a moderate spine, the pair diverging, their inner edges serrulate, the spines extending to nearly opposite first dorsal spine. Temporal region with a slight elevated roughish ridge, but no spine. Preopercular spine long and sharp, its anterior edge somewhat serrulate, no smaller spine below it and none on suborbital stay. Opercular and humeral spines well developed sharp. No trace of spines on suborbital or preorbital. There are but three distinct spines on each side of the head, occipital, opercular, and preopercular. Membranous flap of opercle with a few scales. Gill-rakers long and slender, about equal to half diameter of eye, 8 to 10 well developed.

Scales quite small, those on breast (between ventrals) larger than those on belly or throat; scales extending beyond base of pectorals to isthmus; about 12 to 15 rows between occiput and front of dorsal.

Spinous dorsal rather low; first spine not strongly serrulate, ¾ length of second, which is 2½ in head; first ray of second dorsal weakly serrulate at base; longest ray shorter than snout and slightly less than 3 in head. Longest anal ray 3½ in head. Caudal lunate, 1½ to 1⅔ in head. Pectoral reaching last dorsal ray, a little more than half body. Ventrals reaching vent, 1⅖ to 1½ in head.

Coloration in spirits, grayish, unspotted, more dusky above; spinous dorsal dusky, a distinct black spot between fifth and sixth spines; soft dorsal with three rows of diffuse spots. Caudal dusky on the outer three-fifths and base. Pectorals mostly black, with faint pale cloudings. Ventrals and anal pale. Coloration perhaps red in life.

This small species was dredged in large numbers in 7 fathoms depth at Station 2806; in 14 fathoms at Station 2801; in 16 fathoms at Station 2802; and at 51½ fathoms at Station 2805. Probably none of the specimens examined are fully grown.

21. Prionotus albirostris sp. nov.

DIAGNOSIS.—Approaching *Prionotus quiescens* in technical characters, but very different in appearance; easily distinguished by the form, armature, and coloration of the head.

Type: No. 41,162, U. S. National Museum.

HAB.—Pacific Ocean, off the coast of Colombia; Station 2795; 7° 57′ N., 78° 55′ W.

Description.—Head 3 in length (3¾ with caudal); depth 4½ (5¾). D. X–12; A. 11. Pores along lateral line 50 to 55. Length of the type 5½ inches. Body moderately elongate, little compressed, narrowed above, the width of the nape between the occipital spines being 4½ in head. Head rather short and high; eyes prominent, the anterior profile regularly concave, the eyes and forehead less prominent than in the next species. Snout broad, its breadth at angle of mouth almost equal to its length, 2⅓ in head; its anterior margin not produced, but slightly emarginate, serræ short and even, bluntish, about 20 well developed; whole edge of preorbital with fine serræ. Anterior nostril with a large black flap. Surface of bones of head with strong radiating striæ, those in front of eyes most broken up into granulations. Mouth moderate, maxillary 2¾ in head, not reaching front of eye; band of palatine teeth rather broad. Eye rather large, 4½ in head. Interobital space narrow, deeply concave, smoother than rest of head, its least width 6½ in head. Orbital rim elevated, with coarse spine-like striæ in front, inner largest, forming the preocular spine; upper margin with moderately strong serræ ending behind in a large, supraocular spine. No groove across top of head behind orbital rim. Occipital ridges strong, the inner pair with a few asperities at base, ending in a compressed spine; the outer with stronger serræ at base and extending to opposite first dorsal spine. Temporal ridge slightly crenulate, with two blunt spines. Preopercular spine without a smaller one at base, its edge serrulate; suborbital stay with an elevated serrulate ridge but no spine. Opercular spine small and blunt, smaller than the strong humeral spine. No spines on suborbital or preorbital. Membranous flap of opercle scaly. Gill-rakers rather long and slender, longer than interspaces, about equal to one-third of eye, five most strongly developed. Scales small, those on belly smaller than those on breast, not extending before a line drawn between base of pectorals and ventrals; about seven scales between occiput and dorsal; spinous dorsal moderately high, the first spine very strongly serrulate in front, shorter than second, which is one-half head; first ray of second dorsal serrulate at base, the longest ray very slightly longer than snout.

Longest anal ray 3 in head. Caudal subtruncate, 1$\frac{1}{3}$ in head. Pectorals long, reaching to the last dorsal ray or even farther in young specimens, 1$\frac{9}{10}$ in body. Ventrals reaching third anal ray, 1$\frac{1}{4}$ in head.

Coloration in spirits grayish, unspotted, darkest above, and with darker cross-shades. Snout and jaws white; the tip of both jaws, a bar across both jaws, and one behind angle of mouth, black. A black bar on anterior and another on posterior part of interorbital, the latter extending across the cheeks. First dorsal dusky, vaguely clouded with darker; second, irregularly spotted, its posterior half dusky. Caudal, broadly black at base and tip; its middle part yellowish. Pectorals dark, with a slight violet shade, and traces of darker mottlings. Middle of anal dusky. Ventrals dusky on upper surface.

This species is known from several specimens, the largest 5$\frac{1}{2}$ inches long, dredged at Station 2795, at a depth of 33 fathoms. In its concave profile and prominent eyes it resembles the next species, but its affinities are with the large-mouthed forms, the allies of *Prionotus evolans.*

22. Prionotus xenisma sp. nov.

DIAGNOSIS.—Approaching *Prionotus punctatus* C. & V., from which it is at once separated by the form of the snout and the outline of the profile. It approaches still more closely to *P. birostratus*, from which it is separated by the presence of a smaller spine at the base of the spine on the preopercle. The latter species has also smaller scales and the humeral spines smaller than the spine on the opercle.

Type: No. 41,151, U. S. National Museum.

HAB.—Pacific Ocean, off coast of Colombia, at Station 2795, 7° 57′ N., 78° 55′ W.

Description.—Head 2$\frac{1}{2}$ to 2$\frac{2}{3}$ (3 to 3$\frac{1}{4}$ in total); depth 3$\frac{1}{3}$ to 3$\frac{1}{2}$ (4 to 4$\frac{1}{4}$). D. VIII-11; A. 10. Scales in a longitudinal series, 60 to 70; about 43 oblique series, between gill opening and tail; 35 to 40 pores in lateral line. Length of type, 4 inches.

Body short and robust, little compressed, the width of the nape, between occipital spines, 6 to 6$\frac{1}{2}$ in head. Head, short and high; eyes, prominent; the profile angulated, concave before eye, convex above it. Snout short and broad, its breadth greater than its length, which is 2$\frac{2}{3}$ in head; its anterior margin deeply emarginate, the preorbital produced on each side into a broad triangular spiniferous lobe, which is nearly equal to half diameter of eye.

Surface of bones of head finely and densely granular striate. Mouth small, maxillary 3 to 3$\frac{1}{3}$ in head, not reaching front of eye. Band of palatine teeth rather broad.

Eye large, 4 in head. Interorbital space narrow, deeply concave, and granular striate, its least width 6 to 6$\frac{1}{2}$ in head; orbital rim elevated, its edges granular serrate; no distinct preorbital spine, whole edge of preorbital finely serrulate; a groove across top of head behind the blunt supraorbital spine. Occipital ridges present, the outer granular and not spinous; the inner rather sharply elevated into a short spine; the outer rather wide, extending to second dorsal spine. Temporal region with an elevated roughish ridge, on which are two bluntish prominences. Preopercular spine large and strong, with a smaller one at its base. Opercular spine long and sharp; humeral spine usually larger than opercular. No spines on suborbital.

Membranous flap of opercles not scaly. Gill-rakers short, slender, longer than interspaces, and about equal to three-fifths of pupil. Naked skin of throat with numerous papillæ. Scales rather small, of about equal size on breast and belly; extending beyond base of pectorals, anterior margin forming an obtuse angle; 3 or 4 rows of rudimentary scales between occiput and dorsal. Spinous dorsal high, the first spine longest, 1¾ to 1⅕ in head; anterior margin of first three spines with numerous granulæ; second spine slightly more than two in head, all the spines stout; longest ray of second dorsal shorter than snout, 3⅙ in head. Longest anal ray 3⅔ in head. Caudal slightly lunate, 1¾ in head. Pectorals quite short, reaching fifth ray of second dorsal, 3 in body. Ventrals reaching anal, 1⅖ in head.

Three short granular interspinal bones projecting through the skin between first and second dorsal, the anterior less robust than others.

Coloration in spirits grayish (probably red in life); dusky above and irregularly mottled; a distinct dark spot before base of caudal. Dorsal dusky, with a large black ocellated spot between fourth and fifth spines; dorsal spines with a row of dark spots on their anterior margin; soft dorsal with three rows of dark spots. Pectorals blackish, a few of the upper rays pale on the inner side. Ventrals and anal pale. Caudal barred with dusky.

Very many specimens of this small species were dredged at Station 2795 at a depth of 33 fathoms.

At Station 2805 another species was obtained which resembles this very closely. It is, however, a little more elongate, with rather smaller scales, the caudal fin spotted, and no distinct dark spot at base of caudal. In this species there is no trace of a second spine at the base of the large preopercular spine, and the humeral spine is rather smaller than the opercular. Both have the snout birostrate, the forehead and eyes very prominent, and the pectorals very short. One of these is probably *Prionotus birostratus* of Richardson, and both agree with the short description of the latter given by Dr. Günther. In view of this doubt, we have identified the species with the smaller scales as *P. birostratus*, as Richardson says "Scales very small." Besides the four species mentioned in this paper, specimens were obtained of *Prionotus miles* Jenyns at Charles Island, and of *P. horrens* Richardson at Station 2802.

Runula[*] genus novum. (Blenniidæ.)

Allied to *Petroskirtes* Rüppell, but with the small, inferior mouth destitute of canines; body slender; dorsal fin continuous, its species and soft rays indistinguishable; gill openings reduced; scales none.

Type.—Runula azalea sp. nov.

23. **Runula azalea** sp. nov.

Type: No. ——, U. S. National Museum.

HAB.—Indefatigable Island, Galapagos Archipelago.

Description.—Head $4\frac{4}{5}$; depth $6\frac{1}{5}$; D. about 40, the count uncertain; A. about 25, the count uncertain. Length of type, 2 inches.

Body moderately elongate, not much compressed; head rather long, its upper outlines convex; snout short and very blunt; mouth entirely inferior, transverse, each jaw provided with long, slender, close-set curved teeth; no evident posterior canines; upper jaw rather behind nostril; eye moderate, equal to snout and nearly equal to interorbital width, 4 in head; no tentacles on head; gill membranes fully united to the isthmus, the gill opening reduced to a vertical slit, its lower edge opposite middle of base of pectoral; no scales; lateral line very high, concurrent with the back. Dorsal fin very low, continuous; the feeble spines and soft rays indistinguishable, the fin beginning at occiput; anal similar to soft dorsal. Caudal lunate behind, free from dorsal and anal. Pectorals and ventrals small, each about $1\frac{4}{5}$ in head.

Color reddish brown, silvery below; a black spot surrounded by paler at base of caudal; dorsal with about 6 black cross-bars; anal with four; other fins pale.

A single specimen 2 inches long, taken at Indefatigable Island, in the Galapagos.

24. **Porichthys nautopædium**[†] sp. nov.

DIAGNOSIS.—Similar to *Porichthys margaritatus*, differing chiefly in color. Top and sides of head and space above pectorals with numerous round black spots, which behind pectorals form 6 to 8 vertical half cross-bars; dorsal not margined with black, but with 8 to 10 black submarginal spots; anal, with the exception of a few posterior rays, pale; caudal black at base and tip; pectorals with a few dots at base and on upper rays; a roundish white blotch below eye, below this a jet-black crescent; head $3\frac{1}{3}$ to $3\frac{2}{3}$; depth $4\frac{1}{5}$ to $5\frac{1}{2}$. D. II, 37; A. 33. Palatine teeth small, one or two slightly enlarged. Series of shining spots arranged as in *P. margaritatus.*

Type: No. 41,145, U. S. National Museum.

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[*] Latin runa, a dart.

[†] *ναυτοπαίδιον*, sailor-boy, from the common name of "midshipman," given in allusion to the "buttons" on the belly of the fish.

HAB.—Pacific Ocean off coast of Colombia, from Station 2802, 8° 38′ N., 79° 31′ 30″ W., and Station 2795, 7° 57′ N., 78° 55′ W.

This species was obtained in large numbers at Station 2795 at a depth of 33 fathoms, and at Station 2802 at a depth of 16 fathoms. The largest specimens are about $4\frac{1}{2}$ inches long. It may prove to be merely a color-variety of the northern *P. margaritatus*.

25. **Otophidium indefatigabile** sp. nov.

DIAGNOSIS.—Allied to *Otophidium taylori* (Girard), but with fewer gill-rakers, smaller teeth, and somewhat different coloration.

Type: No. ——, U. S. National Museum.

HAB.—Indefatigable Island, Galapagos Archipelago.

Description.—Head $4\frac{2}{5}$ ($4\frac{1}{2}$); depth $5\frac{2}{3}$ ($5\frac{6}{7}$). Length of type 4 inches. Body rather short, compressed, width of nape $2\frac{1}{2}$ in head. Mouth large; maxillary reaching to opposite posterior margin of pupil, $1\frac{4}{5}$ in head. Outer row of teeth of each jaw very slightly enlarged. Snout shorter than eye, 4 in head. Eye large, 3 in head. Interorbital space 2 in eye. Interorbital area with a thin crest under the skin, this ending in two compressed spines, one turned forward, the other backward, over front of eye, these spines concealed by the skin. Gill-rakers short and thick, less than half pupil; four developed. Dorsal beginning at end of anterior third of pectorals, longest ray $3\frac{1}{2}$ in head. Pectorals 2 in head. Inner ventral filament longest, 2 in head. Air-bladder short and thick, with a foramen. Scales very small, more or less imbricated on body. Head naked. Opercle with a sharp, partly concealed spine. Pseudobranchiæ present.

Color, pale yellowish-brown, silvery on belly and sides of head. Back with about twelve irregular dark cross-bands, the alternate ones being narrower and broken up into spots, two before dorsal; a few scattered spots about as large as pupil on sides, these most distinct about the shoulder. Dorsal pale, first rays black, and with three or four other black blotches on upper part. Anal black, margined with white. Pectorals pale, axil dusky. Caudal and posterior part of anal pale. Chin pale.

The single specimen which is type of this species was obtained at Indefatigable Island, in the Galapagos. Its nearest relative seems to be the Californian *O. taylori*.

26. **Leptophidium prorates** sp. nov.

DIAGNOSIS.—Closely allied to the Atlantic species, *L. brevibarbe* (Cuvier), the scanty descriptions of the latter species being insufficient for comparison.

Type: No. 41,149, U. S. National Museum.

HAB.—Panama and Station 2801, 8° 47′ N., 79° 29′ 30″ W.

Description.—Head $4\frac{1}{3}$ to $4\frac{2}{3}$ ($4\frac{2}{3}$ to $4\frac{3}{4}$); depth $7\frac{1}{3}$ to $8\frac{1}{6}$ ($7\frac{3}{5}$ to $8\frac{1}{2}$). Length of type 10 inches. Body moderately elongate, compressed, considerably stouter than in *L. profundorum.* Mouth large; maxillary reaching about half pupil's length beyond posterior border of eye, $2\frac{1}{4}$ in head. Outer teeth slightly enlarged, a little movable, those of upper jaw largest. Snout shorter than eye, 5 in head. Eye large, $4\frac{1}{2}$ in head. Interorbital space $1\frac{3}{5}$ in eye. Gill-rakers rather long and slender, one-fourth length of eye; four developed. Tip of snout with a strong spine directed forwards and slightly downwards. Opercle without spine, ending in a flat projection covered by skin. Dorsal beginning over middle of pectorals, longest ray 4 in head. Pectorals $2\frac{1}{3}$ in head. Inner ventral filament shortest, the longer $2\frac{2}{3}$ in head.

Scales regularly imbricated but very small, about 225 in a longitudinal series; scales on top of head extending forward to base of ethmoid spine; sides of head covered with small scales. Lateral line not reaching end of tail.

Color, olivaceous, paler below; scales rather profusely dotted with black. A pale shade across opercles. Lower jaw, gular region, and anterior branchiostegals dusted. Dorsal and anal margined with black, the band on anal the broader; pectorals pale.

Air bladder oblong-lanceolate.

Specimens of this species were obtained at Panama and at Station 2801, south of Panama.

27. Bregmaceros bathymaster sp. nov.

DIAGNOSIS.—Closely allied to *Bregmaceros macclellandi*, but apparently differing in the larger size of its scales and in the shorter ventrals.

Type: No. 41,137, U. S. National Museum.

HAB.—Pacific coast of South America, taken at Station 2804, 8° 16′ 30″ N., 79° 37′ 45″ W.

Description.—Head $5\frac{2}{3}$; depth $6\frac{2}{3}$. D. about I, 18, 22, the small rays so broken that the count is uncertain. A. about 18, 22 + V. 4 or 5. Scales about 50, the count very uncertain. Length 2 inches.

Body moderately elongate, compressed, the form somewhat as in *Ophidion*, the back not elevated. Head short and small, moderately compressed; bones of head thin, without serrature or spine; eye moderate, 3 in head; interorbital space ridged, about as broad as eye; snout blunt, rather shorter than eye; mouth very oblique, the jaws subequal; maxillary reaching to beyond middle of eye, $2\frac{1}{5}$ in head; lower jaw flattish, curved upward; teeth in both jaws moderate, slender, close set, recurved, apparently in a single series. Tongue conspicuous; no teeth evident on vomer or palatines; branchiostegals 7 or 8; gill membranes separate, free from the isthmus; no evident pseudobranchiæ; gill-rakers obsolete; no barbels about jaws.

Body with rather large, thin, caducous, scales (nearly all of them fallen in the typical specimens so that they can not be counted).

Dorsal fin beginning with a single long and very slender spine on occiput, this nearly one-third longer than head. Behind this, for a distance about equal to its length, the rudimentary rays, if present, do not rise above the sheath on each side. Nearly opposite the vent begins the dorsal proper, the distance of its first ray from snout being about two-fifths length of body; about 12 rays are moderately elevated, about three-fourths length of head. The others are gradually shorter and more slender, becoming too small to count, until just before caudal, where the fin becomes conspicuous again, this posterior lobe not half so high as the anterior. Anal opposite dorsal and similar to it, the first ray close behind vent; caudal free from dorsal and anal, the caudal peduncle truncate at its base. Ventrals of 3 long rays, with a fourth at the inner base of the third; this fourth is probably a rudiment of two. The ventrals are jugular in position, the rays very long and filamentous, the longest about half the body, reaching end of anterior lobe of anal, but not to the middle of the fin. Pectorals inserted high, somewhat shorter than head. Vent slightly behind end of anterior third of total length.

Color brown above, sides and below silvery; back and base of anal closely dotted with dusky. Dorsal mostly dusky; caudal pale, dusky at base, with a narrow white cross-bar; lower fins pale. The dark markings on front of back assume something of the form of lengthwise streaks.

Two specimens of this species, 1¾ and 2 inches in length were dredged at Station 2804, in 47 fathoms depth. The species is very close to the Chinese *Bregmaceros macclellandi*. It seems, however, to have larger scales and rather shorter ventrals.

28. Azevia querna* sp. nov.

DIAGNOSIS.—Distinguished from *A. panamensis* (Steindachner) by having much smaller *cycloid* scales on eyed side and by its plain coloration.

Type: No. 41,159, U. S. National Museum.

HAB.—Pacific Ocean off coast of Colombia; from Station 2802, 8° 38′ N., 79° 31′ 30″ W., and from Station 2800, 8° 51′ N., 79° 21′ 30″ W.

Description.—Head 3⅓ to 3⅗ (4 to 4⅖); depth 2⅓ (2¾). D. 91 to 95; A. 73 to 75. Scales along lateral line 90 to 95. Length of type 8 inches.

Body shaped as in *Azevia panamensis*. Mouth large; maxillary 1⅘ in head. Teeth as in *panamensis*, in single series, rather long and slender, the anterior somewhat more enlarged. Snout 5 in head, its tip hooked over the lower jaw, so that the outer canines project. Interorbital space rather narrow, slightly concave, with a few small scales, its width a little less than pupil, one-third diameter of eye. Eyes moderate, 5½ in head, the upper somewhat in advance. Gill-rakers short and broad, as in *panamensis*, each with 3–4 strong teeth.

Scales small, cyloid on both sides, those below pectorals more reduced than in *panamensis;* about 65 in a cross-series; anterior part of lateral line bent slightly upward, this portion about 3½ in straight part.

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* *Quernus*, oaken, *i. e.*, tanned.

Dorsal beginning above and between the nostrils, the anterior rays short, but with free tips; longest ray 2½ in head. Pectorals of eyed side 1⅘ to 2 in head, of blind side 2⅓ to 2½. Ventrals subequal, both 6-rayed, 2⅚ in head, extending one-third their length beyond vent.

Color plain brown, unspotted. Fins dusky, thickly punctulate; young with two large oval indistinct dark spots on dorsal and anal, three on caudal, of which the middle is much larger.

Numerous specimens, the largest about 8 inches in length, were dredged in 7 fathoms at Station 2800, and in 16 fathoms at Station 2802. The closely related species, *Azevia panamensis*, was obtained at Station 2797. *Azevia querna* is probably the species obtained by Professor Gilbert at Mazatlan in 1882. (See Jordan & Goss, Review *Pleuronectidæ*, 1889, p. 271.)

29. **Hippoglossina macrops**[*] Steindachner.

HAB.—Pacific Ocean off coast of Colombia; at Station 2805, 7° 56′ N., 79° 41′ 30″ W.

Description.—Head 3 (3¾ to 3⅘) in length; depth 2⅔ to 2¾ (3⅓ to 3½.) D. 60 to 63; A. 47 to 49. Scales along lateral line 70 to 75. Length of type 7 inches.

Body regularly elongate, elliptical, dorsal and ventral outlines equally curved; orbital rim entering anterior profile, which is equally curved before and behind eyes; greatest depth of body above pectorals. Mouth rather large, the maxillary reaching about to middle of pupil, 2⅓ to 2⅚ in head. Teeth equally developed on both sides, small and equal, uniserial. Snout 5 in head; the premaxillary spine prominent. Interorbital space a narrow, sharp, naked ridge; eyes large, the lower slightly in advance of upper, 3⅔ to 4 in head. Gill-rakers moderately long and slender, the longest 3 in length of ventral of eyed side; 9 developed, the last 2 much shorter.

Scales small, firm, strongly ctenoid, those below pectoral much reduced, about 40 in a cross-series; arch of lateral line strongly marked, 2⅔ to 2⅘ in straight part.

Dorsal beginning above middle of pupil of upper eye, its anterior rays low, its longest rays $2\frac{4}{7}$ in head. A strong antrorse spine before anal. Pectoral of eyed side 2 in head, that of blind side 2½ to 2⅔ in head. Ventrals subequal, both 6-rayed, 4 in head, extending more than half their length beyond anus. Both are lateral, but that of eyed side nearest ridge of abdomen, and a little behind its fellow. Last ray of left ventral joined to abdomen alongside of anal spine. Caudal acute, its peduncle long.

Color greyish brown, a row of six round, bluish spots, smaller than pupil, along base of dorsal, four similar spots along base of anal, and a few indistinct smaller ones on rest of body and head. Body with six large black spots somewhat smaller than eye; these are regularly four below dorsal and two above anal, the first of dorsal above arch of lateral line, the second above anterior third of straight part, the third at base of last rays and almost forming a cross-bar with the one at base of anal rays.

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[*] These specimens, at first taken by us for a distinct species, seem to be the young of *Hippoglossina macrops*.

Dorsal, anal, and caudal dusky, with small whitish spots; a pale spot at base of last four dorsal and anal rays; a small black spot at base of outer caudal rays on peduncle. Pectorals and ventrals dusky, but not spotted. Right side immaculate.

Numerous specimens were dredged at Station 2805, at a depth of $51\frac{1}{2}$ fathoms.

Engyophrys gen. nov.

Allied to *Platophrys* (Swainson), but having the interorbital space very narrow and armed with a spine, and the scales of moderate size and cycloid. Gill-rakers obsolete. No anal spine. Gill-membranes entirely separate.

It is nearest the genus *Engyprosopon* Günther, but in that group the interorbital space is broader, the scales ctenoid, and the gill-rakers developed.

Type: Engyophrys sancti-laurentii.

30. **Engyophrys sancti-laurentii**[*] sp. nov.

DIAGNOSIS.—This peculiar species is distinguished from species of *Platophrys* and *Engyprosopon* by its very narrow interorbital ridge; from the species of *Arnoglossus* by the form of the body, the short gill-rakers, etc.; and from all related species by the peculiar coloration of the blind side.

Type: No. 41,155, U. S. National Museum.

HAB.—Pacific Ocean, off coast of Colombia; from Station 2805, 7° 56′ N., 79° 41′ 30″ W., and Station 2795, 7° 57′ N., 78° 55′ W.

Description.—Head $2\frac{2}{5}$ to $2\frac{4}{7}$ (3 to $3\frac{1}{2}$); depth $1\frac{2}{3}$ to 2 (2 to $2\frac{1}{3}$). D. 78 to 85; A. 68 to 72. Scales 60 to 68, along lateral line. Length of type $4\frac{1}{2}$ inches.

Body broadly ovate, much compressed, the greatest depth over pectorals; dorsal and ventral outlines equally curved; profile scarcely concave before eyes. Mouth very small, oblique, the maxillary reaching opposite pupil of lower eye, 4 to $4\frac{1}{2}$ in head. Teeth present on blind side well developed, close set, and even; none on vomer. Snout short, $4\frac{1}{2}$ to 5 in head. Interorbital space a very narrow, sharp, scaleless ridge, the ridge forking above pupil, leaving a very narrow concavity anteriorly; lower ridge armed with a strong spine, turned backward, inserted just above pupil of lower eye. Anterior orbital rim of upper eye rather high, entering profile. Eyes large, lower in advance of upper, 3¾ to 4 in head. Gill-rakers almost obsolete, represented by 5 or 6 small fleshy papillæ.

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[*] In allusion to the gridiron-like markings on the blind side.

Scales moderately small, cycloid, and not very firmly attached; small scales on rays of dorsal and anal fins; arch of lateral line short and small, but abrupt, 4 to 5 times in straight part. Dorsal beginning on blind side just behind posterior nostril and in front of eye. Pectoral of colored side 2 in head, that of blind side 2½ in head. Ventrals of colored side slightly longest, 3 in head; that of colored side with 6 rays, of blind side with 5 or 6 rays.

Color of left or eyed side blackish-brown, with scattered white and black spots, the latter most prominent along base of dorsal and anal fin. Three large black non-ocellated blotches on straight part of lateral line, the first at beginning, second at middle, third on peduncle. Fins dusky; dorsal and anal with scattered white and black spots; caudal with five black spots arranged in a curved series. Blind side with five or six curved parallel dusky bands as wide as eye, the first beginning on interopercle and curving across cheeks to along base of dorsal; second beginning at throat and curving along posterior margin of preopercle, and extending on back, parallel with the first from vent; third curving around in front of pectorals, across posterior part of opercle, and extending to base of dorsal fin behind the middle; rest behind pectorals. All of these bands fade out behind middle of body, so that the posterior portion is immaculate. In young examples these bands are very faint or obsolete.

Numerous specimens, the largest about 4½ inches long, were dredged at Station 2795, at a depth of 33 fathoms, and at Station 2805 at a depth of 51½ fathoms.

31. **Symphurus atramentatus** sp. nov.

DIAGNOSIS.—Related to *Symphurus atricauda* (Jordan & Gilbert), but distinguished by having 3–6 black oblong blotches on posterior part of dorsal and anal; the general coloration darker; the scales and eyes larger.

Type: No. 41,157, U. S. National Museum.

HAB.—Station 2795, off the Pacific coast of Colombia, 7° 57′ N., 78° 55′ W.

Description.—Head 4⅔ to 5 (5 to 5⅓); depth 3⅓ to 3⅔ (3½ to 3⅘). D. 92 to 95; A. 75 to 78. Scales 95 to 100, 38 in a cross-series. Length of type 4½ inches.

Body more elongate than in *S. atricauda.*

Eyes larger than in *S. atricauda*, the upper in advance of lower, vertical diameter of both 3½ to 4 in head. Cleft of mouth somewhat more curved than in *S. atricauda*, otherwise similar.

Scales larger than in *S. atricauda*, 95 to 100 in a longitudinal series, 38 in a cross-series; spines on posterior margin not so strong.

Ventral fins (measured from angle of gill-opening) 2⅔ to 3 in head.

Color light brown, irregularly barred and marbled with darker; several irregular grayish bars most distinct on posterior parts, a distinct narrow dark bar behind gill-opening. Anterior part of dorsal and anal fins pale, posterior dark; anterior part with 4 to 7 dusky oblique areas, posterior part with 3 to 6 roundish inky-black spots. Caudal black narrowly tipped with white. All the scales with a narrow dark edge.

This small sole is very closely related to the others of the genus. We are, however, unable to identify it with either of the two species, *S. atricauda* and *S. elongatus*, found on the Pacific Coast, and therefore give it a new name. Many specimens were dredged at a depth of thirty-three fathoms at Station 2795.

32. **Symphurus leei** sp. nov.

DIAGNOSIS.—Related to *Symphurus atricauda* (Jordan & Gilbert), but the body with four wide black cross-bands, and the form more elongate.

Type: No. 41,134, U. S. National Museum.

HAB.—Station 2804, off the Pacific coast of Colombia, 8° 16′ 30″ N., 79° 37′ 45″ W.

Description.—Head 4 to 4½ (4⅓ to 4⅔); depth 3⅘ to 4 (4⅕ to 4⅓). D. 95 to 100; A. 80 to 85. Scales 80 to 90, 35 to 38 in a cross-series. Length of types 4¼ inches.

Body more elongate than in *S. atricauda* or *S. atramentatus*, approaching that of *S. elongatus;* outline of under part of head more oblique than in the other Pacific Coast species.

Eyes larger than in the preceding species, the upper in advance of lower, their vertical diameter 5 to 5½ in head. Cleft of mouth extending slightly farther back than in *S. atricauda* or *atramentatus*, but not beyond eye as in *S. elongatus;* maxillary reaching posterior border of eye 3⅔ to 4 in head. Snout 5⅕ to 5⅔ in head.

Opercular flap larger than in other Pacific species.

Scales comparatively large, not so firmly imbedded as in *S. atricauda* or *atramentatus;* those on opercles rather large.

Ventrals 3⅓ to 3½ in head.

Color light brown, speckled with darker, and with three or four broad black cross-bands, width of median bands 2½ to 3 in head, the posterior band widest. Caudal and the posterior ⅖ of the dorsal and anal black; no black spots on dorsal. Scales thickly punctulate, but with no distinct darker edgings.

Many specimens of this species were obtained at Station 2804 at a depth of 47 fathoms. It is evidently very different from *S. atramentatus*, and needs comparison only with *S. elongatus*, from which it seems to be sufficiently distinct. We have named the species for Prof. L. A. Lee and Mr. Thomas Lee, naturalists on board the *Albatross* when the species was discovered.

The following is a complete list of the species obtained at Panama, at the Galapagos Islands (Charles, Chatham, Hood, James, Indefatigable, Albemarle, and Abingdon), and at the various dredging stations off the west coast of the United States of Colombia. These stations are numbered 2794 to 2809. The following table gives the location and depth of water of each:

Dredging stations.

Station No.	Latitude.				Longitude.				Depth in fathoms.
	°	′	″		°	′	″		
2794	7	37	0	N.	78	46	30	W.	62
2795	7	57	0		78	55	0		33
2796	8	5	0		78	51	0		33
2797	8	6	30		78	51	0		33
2799	8	44	0		79	9	0		29½
2800	8	51	0		79	31	30		7
2801	8	47	0		79	29	30		14
2802	8	38	0		79	31	30		16
2803	8	27	0		79	35	0		26
2804	8	16	30		79	37	45		47
2805	7	56	0		79	41	30		51½
2809	0	50	0	S.	89	36	0		45

Galeorhinidæ:

Eulamia lamiella (Jordan & Gilbert). Chatham.
Galeocerdo maculatus (Ranzani). Panama.
Galeus dorsalis (Gill). Panama.

Rajidæ:

Raja equatorialis Jordan & Bollman. Station 2797.

Torpedinidæ:

Discopyge ommata Jordan & Gilbert. 2797.

Dasyatidæ:

Urolophus goodei Jordan & Bollman. 2797

Siluridæ:

Tachysurus platypogon (Günther). 2795.
Tachysurus elatturus (Jordan & Gilbert). (Var.?) 2800.

Albulidæ:

Albula vulpes (L.). Panama.

Clupeidæ:

Pellona panamensis Steindachner. Panama.
Clupea sp. (very young). Indefatigable.

Stolephoridæ:

Cetengraulis mysticetus (Günther). Panama.
Stolephorus poeyi Günther. Panama.
Stolephorus ischanus Jordan & Gilbert. Panama.

Synodontidæ:

Synodus evermanni Jordan & Bollman. 2805, 2797, 2795.
Synodus jenkinsi Jordan & Bollman. 2797, 2800, 2799.

Murænidæ:

Muræna lentiginosa Jenyns (=*M. pinta* Jordan & Gilbert). Charles.

Ophisuridæ:

Ophichthus evionthas Jordan & Bollman. Hood.
Ophichthus rugifer Jordan & Bollman. Charles.

Congridæ:

Ophisoma nitens Jordan & Bollman. 2801.
Muraenesox coniceps Jordan & Gilbert. 2795. Panama.

Cyprinodontidæ:

Pœcilia elongata Günther. Panama.

Exocœtidæ:

Exocœtus cyanopterus C. & V. James.
Halocypselus evolans (L.), 6° south of equator.
Fodiator acutus (C. & V.). Panama.
Hemiramphus unifasciatus Ranzani. Panama.
Hemiramphus roberti (C. & V.). Indefatigable. Chatham.
Tylosurus stolzmanni (Steindachner). Indefatigable; Panama.

Fistularidæ:

Fistularia depressa Günther. Panama.

Mugilidæ:

Mugil curema C. & V. Panama.
Mugil cephalus L. (rammelsbergi). Chatham; Hood.
Mugil species nova (?).
Chænomugil proboscideus (Günther). Panama.
Querimana harengus (Günther). Panama.

Atherinidæ:

Menidia gilberti Jordan & Bollman. Panama.

Polynemidæ:

Polydactylus opercularis (Gill). 2804. Panama.
Polydactylus approximans Lay & Bennett, 2800. Panama.

Trichiuridæ:

Trichiurus lepturus L. Panama.

Scombridæ:

Scomber colias Gmelin. Albemarle.
Scomberomorus maculatus (Mitchill). Panama.

Carangidæ:

Oligoplites altus (Günther). Panama,
Oligoplites saliens (Bloch & Schneider). Panama.
Decapterus hypodus Gill. Charles.
Caranx latus Agassiz. Panama; Chatham.
Caranx hippos (L.). Panama.
Vomer setipinnis (Mitchill). 2800, 2801, 2797, 2802, 2804. Panama.
Chloroscombrus orqueta Jordan & Gilbert. Panama.
Seriola dorsalis Gill (?). Albemarle.

Stromateidæ:

Stromateus palometa Jordan & Bollman. 2804.

Centropomidæ:

Centropomus armatus Gill. Panama.

Serranidæ:

Rypticus nigripinnis Gill. Panama.
Epinephelus labriformis (Jenyns). Indefatigable; Charles.

Serranidæ—Continued.
Epinephelus analogus Gill. Charles; Panama.
Mycteroperca olfax (Jenyns). Abingdon; Charles.
Paranthias furcifer (C. & V.). Albemarle; Chatham; Hood; Charles.
Paralabrax albomaculatus (Jenyns). Albemarle; Charles.
Prionodes stilbostigma Jordan & Bollman 2809.
Prionodes fasciatus Jenyns. Hood; Albemarle; Charles.
Diplectrum radiale (Quoy & Gaimard). 2800. Panama.
Diplectrum macropoma (Günther). 2795, 2797, 2800, 2799. Panama.
Diplectrum euryplectrum Jordan & Bollman. 2795, 2805, 2797.
Cratinus agassizi Steindachner. Charles.
Kuhlia arge Jordan & Bollman. Chatham.

Sparidæ:
Xenichthys xanti Gill. Panama.
Xenocys jessiæ Jordan & Bollman. Charles.
Lutjanus inermis Peters. Panama.
Lutjanus guttatus Steindachner. Panama.
Hæmulon scudderi Gill. Panama.
Anisotremus bilineatus (C. & V.). Hood. Indefatigable.
Anisotremus tæniatus Gill. Panama.
Pomadasis panamensis (Steindachner). 2805, 2800, 2801.
Pomadasis macracanthus (Günther). Panama.
Pomadasis leuciscus (Günther). Panama.
Pomadasis elongatus (Steindachner). Panama.
Orthopristis chalceus (Günther). Panama; Albemarle; Chatham; Charles.
Calamus taurinus (Jenyns). Charles.
Archosargus pourtalesi (Steindachner). Chatham.

Mullidæ:
Upeneus grandisquamis Gill. 2800. Panama; Chatham.

Sciænidæ:
Archoscion remifer (Jordan & Gilbert). Panama.
Cynoscion reticulatus (Günther). Panama.
Cynoscion stolzmanni Steindachner(?). Panama.
Cynoscion phoxocephalum (Jordan & Gilbert). Panama.
Nebris microps C. & V. Panama.
Larimus argenteus (Gill). Panama.
Larimus pacificus Jordan & Bollman. Panama.
Bairdiella ensifera (Jordan & Gilbert). Panama.
Bairdiella armata Gill. Panama.
Bairdiella chrysoleuca (Günther). Panama.
Stelliferus oscitans Jordan & Gilbert. Panama.
Stelliferus ericymba Jordan & Gilbert. Panama.
Sciæna typica (Gill). Panama.
Sciæna imiceps Jordan & Gilbert. Panama.
Micropogon altipinnis Günther. Panama.
Polycirrhus rathbuni Jordan & Bollman. Panama.
Polycirrhus dumerili Bocourt. Panama.
Menticirrhus nasus (Günther). Panama.

Gerridæ:
Gerres gracilis (Gill). Panama.
Gerres californiensis (Gill). Panama.
Gerres cinereus (Walbaum). Chatham.
Gerres peruvianus Cuv. & Val. Panama.

[illegible] Panama.

[illegible] Charles.

[illegible] Albemarle.

[illegible] Panama.

[illegible] 2405, 2795.

[illegible]

Pleuronectidæ—Continued.

Platophrys constellatus Jordan. 2795, 2797, 2796.
Platophrys leopardinus (Günther). Chatham.
Hippoglossina macrops Steindachner. 2805, 2804.
Achirus fonsecensis (Günther). Panama.
Symphurus atramentatus Jordan & Bollman. 2795, 2797, 2805.
Symphurus elongatus (Günther). 2804.
Symphurus leei Jordan & Bollman. 2800, 2802, 2803.

Balistidæ:

Balistes capistratus Shaw. Chatham.

Tetraodontidæ:

Spheroides fürthi (Steindachner). 2800.
Spheroides politus (Ayres). Panama.
Spheroides annulatus (Jenyns). Indefatigable; Albemarle; Panama; Chatham.
Spheroides angusticeps (Jenyns). Chatham; Charles; Panama.
Tetraodon erethizon (Jordan & Gilbert). Panama.

Lophiidæ:

Lophius sp. (very young). 2804.

Malthidæ:

Malthe elater Jordan & Gilbert. Panama.

THE INDIANA UNIVERSITY, *June* 27, 1889.

SCIENTIFIC RESULTS OF EXPLORATIONS BY THE U. S. FISH COMMISSION STEAMER ALBATROSS.

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NO. V.—ANNOTATED CATALOGUE OF THE INSECTS COLLECTED IN 1887-'88.

BY

L. O. HOWARD,

Acting Curator of the Department of Insects.

INTRODUCTION.

Upon assuming charge of the Department of Insects, after Dr. Riley's departure for Europe in April last, I found this collection awaiting report, and learned that the *Myriapoda* and *Arachnida* received with the *Hexapoda*, under Accession Number 21699, had been sent to specialists for report. After a review of the material, and notification from the office of the Assistant Secretary in charge of the Museum that a speedy report was desirable, I decided that the most expeditious and satisfactory method of determining the collection would be to call upon the best known specialists in the country for assistance. I therefore sent the *Hemiptera* of the collection to Prof. P. R. Uhler, of Baltimore, Md.; the *Orthoptera* to Mr. Lawrence Bruner, of Lincoln, Nebr.; the *Diptera* to Dr. S. W. Williston, of New Haven, Conn.; the *Lepidoptera* to Rev. W. J. Holland, of Pittsburgh, Pa.; and the *Mallophaga* to Prof. Herbert Osborn, of Ames, Iowa. All of these gentlemen very kindly sent in prompt and satisfactory reports, and each is wholly responsible for the determinations in his group. The remainder of the material was determined by the Aid of the Department, Mr. M. L. Linell.

The method of arrangement adopted was deemed most desirable as giving at a glance an idea of the collections made in each general locality, but at the same time it rendered it impossible to publish each report by itself.

The *Arachnida* have been determined by Dr. George Marx, of the Department of Agriculture, and it has been deemed best to place his report in its entirety at the end of the *Hexapoda*. His report includes certain manuscript names, and the specific descriptions accompanying will be published elsewhere.

The *Myriapoda* were submitted to Mr. Charles H. Bollman, of Bloomington, Ind., who finds but eight species represented. His report is so short that his descriptions of new species are included.

The material as a whole is of great interest, and presents a strong argument in favor of future collections by the Fish Commission steamers and other Government vessels. From our standpoint the collections are surprisingly small, and but little time has evidently been given to these three classes. Conspicuous species have in most cases been preferred, and in all of the localities an hour's industrious sweeping of the herbage with a beating-net would have infinitely enriched the collections.

HEXAPODA.

CLEMENTE ISLAND, CALIFORNIA.

COLEOPTERA.

Family CARABIDÆ.

Besides fragments of the common Californian *Anisodactylus brunneus* Dej., a new species of *Calosoma* was collected here. 2 ♂ ♂. Size of *C. palmeri* Lec. from Guadeloupe Island, but different in form and sculpture.*

Family TENEBRIONIDÆ.

Eulabis grossa Lec.

One specimen.

Eusattus robustus Lec.

Three specimens.

These two species seem to be peculiar to the island.

Eleodes dentipes Esch.

One specimen. Occurs abundantly in South California.

LEPIDOPTERA.

Family BOMBYCIDÆ.

One larva of *Spilosoma* sp.

LOWER CALIFORNIA AND PANAMA.

COLEOPTERA.

Family TENEBRIONIDÆ.

Asida morbillosa Lec.

One specimen. Ballenas Bay.

Asida obsoleta Lec.

Fragments of a variety of this Californian species were taken on St. Margarita Island.

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* The coleopterological fauna of Clemente Island is quite well known, and the occurrence of this conspicuous new Calosoma under this locality label arouses the suspicion that a mistake may have been made.—L. O. H.

Eleodes quadricollis Esch.

Thirty-seven specimens. St. Margarita Island. Occurs also abundantly in Southern California.

Eleodes militaris Horn.

Eleodes dentipes Esch.

Eleodes acuticauda Lec.

Fragments of these three species found at Ballenas Bay.

Cryptoglossa sp.?

Fragments. Ballenas Bay.

Cerenopus costulatus Horn.

A female and fragments of another specimen of this rare species found at Ballenas Bay.

Argoporis, new species.

Six specimens. St. Margarita Island.

Family MELOIDÆ.

Tegrodera erosa Lec.

Four specimens. St. Margarita Island. A species well known from Southern California.

Family CERAMBYCIDÆ.

Megaderus stigma Lin.

One specimen. Panama.

ORTHOPTERA.

Family ACRIDIIDÆ.

Schistocerca vaga Scudd.

A single female specimen from Ballenas Bay belongs here.

Thrincus californicus Thos.

A single pupa of this species is contained in the collection from Cerros Island.

Five specimens of a rather large *Acridiid* were collected at Cerros Island. This insect is a rather peculiar one, since from its general appearance it can easily be mistaken for one of the *Œdipodinæ.* A casual glance will, however, be sufficient to show its relationship with the *Rhomaleans* on the one side and the *Truxalids* on the other. It is one of comprehensive forms sometimes met with among insects. The strongly spined prosternum forbids its being placed either with the *Œdipodinæ* or *Truxalinæ,* while the structure of the pronotum gives its place with the *Tropidinotians.* It may be new, but from want of the proper reference-books I refrain from describing it as such.

Family BLATTIDÆ.

Blabera limbata (Burm.).

A single specimen from Panama belongs here.

Nyctobora ? holosericea ? Kl.

Two immature specimens of a cockroach from Panama are placed in the genus *Nyctobora* and referred to *holosericea* Kl. with doubt.

HEMIPTERA.

Tetyra farcta Germar, (*Pachycoris*). Zeits. I, p. 92.

No. 20. *Pachycoris guttipes* Walker, Brit. Mus., Cat. Hem., I, p. 47, No. 11.

One female from Panama. It has the antero-lateral margins of the pronotum a little more expanded than in the normal Mexican specimens, and the black dots much reduced in size.

Augocoris sexpunctatus Fabr. (*Cimex*), Spec. Ins., II, p. 339, No. 7.
Augocoris sexpunctatus Stål, Enum. Hemipt., I, p. 18, No. 2.

Two males were taken on board the ship at electric light, latitude 4° 18′ N., longitude 85° W. The smaller one is suffused with rose color on the upper side, and it is evidently immature, with the exterior integument imperfectly oxidized, and consequently it would have been dark colored if allowed to reach maturity. It is remarkable for having the rostrum very nearly as long as the body. The tip of this organ as now resting reaches almost to the end of the anal segment, but if set flat against the venter it would reach quite to the extremity of that segment.

Augocoris ehrenbergii Germar, Zeits., I, p. 140, No. 2.

One male from Panama, captured on board ship, March 6. It is only in deference to the views of my friend, the late Dr. Carl Stål, that I retain this species as separate from the preceding. The length of the rostrum is now observed to be of no value in separating the species of this genus.

Family COREIDÆ.

Catorhintha guttula Fabr. (Lygæus), Ent. Syst., IV, p. 162, No. 92.

A single immature female was collected at Panama. It is larger than the typical specimens from the West Indies and Central America, has the antenniferous spine longer and more curved, and one of the spines is wanting on the right-hand side.

MALLOPHAGA.

(On *Diomedea exulans*).

Two species of Lipeurus.

Lipeurus taurus Nitsch.

Many specimens of males, females, and young.

Lipeurus diomedeæ F. ♂, ♀, juv., and eggs.

Fabricius's description is very meager. Dufour described it fully as did Giglioli from *D. brachyura*. Piaget thinks *L. ferox* of Giebel from *D. melanophrys* the same, but makes *diomedeæ* the synonym. The identity of the forms from the different species of *Diomedeæ* is supported by careful comparison of these specimens with the descriptions of various authors and with a ♀ from the *D. brachyura* in my possession. The eggs inclosed in the vial with these and *L. taurus* probably (almost certainly) belong to *diomedeæ*. They are very large, 2.4^{mm} long. Their shape is peculiar, reminding one of the valves of a barnacle, flattened, attached by a short pedicel, the outline as a whole semicordate, the straight line running from pedicel to apex and the opposite sides curved. Black lines run along the margin and on each face parallel to these, and a short, transverse line near the center; between this and the base are two irregular spots or expansions of the dark lines.

(On *Phaëton æthereus*).

No species have been described from this bird to my knowledge, and if so it must have been since the publication of Piaget's "Les Pediculines"

Docophorus sp.

An undescribed species, 2^{mm} long, with triangular head, narrow clypeus which is deeply emarginate. The color is brown, and the transverse bands of the abdomen run without interruption the width of the segments. Differs decidedly from *D. hexagonus* Giebel described from *Phæton phœnicurus*, in having the clypeus deeply cut instead of evenly truncate. Approaches *D. breviantennatus* Piaget, which occurs on *Sula australis*, but appears to be slightly smaller and lighter colored, while the abdominal bands are not interrupted in the middle. Three specimens. If desired to designate by name it may be called *Docophorus phætonus*.

Menopon sp. near *fuscofasciatum* Piag.

Agrees very closely with *fuscofasciatum* described from *Lestris pomarina* except that it appears somewhat more robust than shown in Piaget's figure. Whether the difference is sufficient for formation of a new species is doubtful without comparison with specimens of that species.

Colpocephalum sp. near *angulaticeps* Piaget.

Agrees more closely with *C. angulaticeps* from *Fregata minor* than with *C. incisum* from *Phæton flavirostris*. A very minute species, of which there was a single specimen in the vial with other lice from *Phæton æthereus*, and this was unfortunately lost by accident, an involuntary cough carrying it from the slide while placed under the microscope for dry examination.

NEUROPTERA.

Family LIBELLULIDÆ.

Anax junius Drury.

A specimen of this widely distributed species was caught on board on the Pacific coast. It also occurs in our Southern States.

Family TERMITINA.

A colony of Termites was collected at Panama, but no winged specimens. The species consequently can not be determined.

LEPIDOPTERA.

Family NYMPHALIDÆ.

Heliconius apseudes Hübn. (Sicyonia A.), Zutr. Ex. Shmett., Figs. 141, 142.

One example; ♂. Panama.

Elnia vanessoides Blanch. Gay, Faun. Chil., VII., p. 28, Pl. V, Fig. 5, 6.

One very badly worn female specimen, ticketed "Panama."

Family SPHINGIDÆ.

Ællopus titan Cram. Pap. Exot., Pl. 142, Fig. F.

One example, ticketed "Off Taboga, Bay of Panama."

Family SESIIDÆ.

Isanthrene crabroniformis Stand.

One example; ♀; labeled "Panama."

HYMENOPTERA.

Family MYRMICIDÆ.

Cremastogaster lineolata Say.

A specimen from Ballenas Bay shows that this, our common species, has a wide distribution.

Family POMPILIDÆ.

Pepsis formosa Say.

Of this Arizona species a specimen was collected on St. Margarita Island.

Family VESPIDÆ.

One poor specimen of the genus *Polybia*, from Panama.

A light-colored specimen of *Polistes* from St. Margarita Island, somewhat different from any of our southwestern forms, and two specimens of an obscure species of the same genus collected at Panama.

DIPTERA.

Family TABANIDÆ.

One specimen of a species belonging to the genus *Tabanus* from Panama. It resembles *T.* (*Atylotus*) *insuetus* O. S., though different.

GALAPAGOS ARCHIPELAGO.

COLEOPTERA

Family CARABIDÆ.

Calosoma galapagoum? Hope, Trans. Ent. Soc., 1838.

Fifty-eight specimens (2, Duncan Island, 44, Charles Island, and 12, Chatham Island) were collected of a *Calosoma* that is of a shining bronze-green color and has the elytral intervals distinctly carinated, with the third, seventh, and tenth broken up by large punctures. The male has three tarsal joints strongly dilated and spongy beneath. Hope describes his species above as black and smooth, with three rows of punctures on the elytra. Still it is likely to be the same species. Together with all the following Galapagos beetles described by Hope and Waterhouse, it was first collected by Charles Darwin during the famous *Beagle* expedition.

Pœcilus calathoides Waterh., Ann. Nat. Hist., XVI, 1845.

A pair was found on Charles Island; the male is shining, the female opaque.

Selenophorus galapagoensis Waterh., Ann. Nat. Hist., 1845.

Five specimens from Charles Island.

Family PTINIDÆ.

One specimen of the genus *Tetrapriocerca* was collected on Indefatigable Island. Although of the same habitus it is probably different from our Florida species, *T. longicornis* Oliv., which is known to have a wide distribution in Central and South America..

Family SCARABÆIDÆ.

Oryctes galapagoensis Hope, Ann. Nat. Hist., 1845.

One specimen from Chatham Island. It is 1 inch long, shining chestnut-brown.

Family CERAMBYCIDÆ.

Mallodon sp.?

Thirteen specimens were collected on Chatham Island and one on Duncan Island. As no species of this conspicuous genus had been previously recorded from this island group, it will be highly interesting to see whether it is a new species, peculiar to the archipelago, or whether it belongs to a continental form. This can not be settled at the present time. All the other *Coleoptera* from this locality are not found elsewhere.

Eburia amabilis Bohem., Eugen. Resa, 1859.

One specimen of this elegant species was captured on Charles Island.

Family CISTELIDÆ.

Two specimens of a species of *Allecula*, probably new, from Charles Island.

Family TENEBRIONIDÆ.

Stomion galapagoensis Waterh., Ann. Nat. Hist., 1845.

Stomion helopoides Waterh., *l. c.*

The series collected is sufficient to prove the identity of these two species, and it is interesting to notice the same variability in sculpture that characterizes our western *Tenebrionidæ*. Thirteen specimens from Charles Island and five from Chatham Island.

Ammophorus bifoveatus Waterh.

One specimen from Charles Island.

Family CURCULIONIDÆ.

Three specimens of a form belonging to this family were collected on Chatham Island.

ORTHOPTERA.

Family FORFICULIDÆ.

Anisolabis maritima? Bon.

A single earwig, collected on Chatham Island, is doubtfully referred to this species. It agrees more closely with *A. azteca* Dohrn. in general color than it does with *maritima*, but in size it approaches more nearly the latter.

Family GRYLLIDÆ.

A cricket of the genus *Gryllus*, of which there are eleven (immature and mature) specimens, one collected on Albemarle Island, the others on Chatham Island; bears a close resemblance to the common *Gryllus domesticus*, if it is not that species. My material is scant in this group, and especially in foreign forms; and not wishing to rely entirely upon comparisons with descriptions in so difficult a group as this is, I have hesitated to decide further.

Family LOCUSTIDÆ.

Bucrates? cocanus? Boliv.

The species which is referred to the above-named genus and species with doubt, is represented by a single very young larva. In addition to its youth, it is alcoholic as well as somewhat mutilated.

Anaulocomera cornucervi? Brunner.

There is also a pair of small katydids, one from Chatham Island and one from Indefatigable Island, belonging to the genus *Anaulocomera*.

Although the specimens are alcoholic, the long stag-horn-like cerci of the male will hardly leave room for doubt as to its identity with *cornu-cervi* of Brunner.

Family ACRIDIIDÆ.

Schistocerca melanocera Stål.

There are thirty-eight specimens of this beautiful large locust (collected—sixteen on Indefatigable Island, fifteen on Charles Island, three on James Island, four on Albemarle Island, and six on Duncan Island). They are somewhat larger than our *americana* and the oriental *peregrina*, with the wings longer and more ample. It is therefore well equipped for long flights, which it evidently sometimes takes.

There are also four specimens, from Chatham Island, of a much smaller locust belonging to the same genus with the preceding. Whether or not it is a described species I am unable to say until after I have had the opportunity of examining several works upon these insects that I do not have in my library. It is a diminutive of *americana* in many respects, the females being only a trifle over 1¼ inches in length, while the males are even smaller.

In addition to the specimens above enumerated the collection also contains four pupæ of some member of the same genus, and perhaps of the preceding species, since they too were taken on Chatham Island.

Among the others from Chatham Island are two specimens of *Acridii* belonging close to the genus *Pezotettix*, but I do not care to definitely place them, since one is immature and the other has no abdomen. The tegmina and wings of the mutilated one are rudimentary, and it evidently measured 25^{mm} in length. The posterior femora are marked with three moderately broad, dusky bands, both internally and externally.

A small specimen, a male, of a locust that at first glance reminds one of the lined *Stenobothri* on account of the trivittate coloring of the head, pronotum, and tegmina, but which, upon a closer inspection, is found to be an *Acridiid*, is placed in the genus *Euprepocnemis*. It is probably an undescribed form. Indefatigable Island.

Trimerotropis placida? Stål.

Two specimens of a small *Trimerotropis* are placed here, although Saussure in his "Prodromus Œdipodiorum" makes it a synonym of *Tr. ochraceipennis* (Blanch.). Length of body, ♀, 20 to 22 millimeters. James Island.

Family BLATTIDÆ.

Periplaneta americana Linn.

Ten specimens of this cosmopolitan cockroach were collected on Chatham Island.

Periplaneta australasiæ Fab.

Also widely distributed. Three mature specimens and three mature larvæ from Charles Island.

Leucophæa surinamensis (Lin.).

This rather widely distributed species of cockroach is represented in the present collection by three mature and nine immature specimens. Of the former one, a rather darker form than usual is from Bahia, Brazil; three young are from the Island of Abrolhos. The remaining specimens are from the Galapagos Islands.

Nauphœta bivittata Brunner.

Three specimens from Chatham Island are referred here.

Nauphœta lævigata? (Pal.).

The Galapagos Islands material also contains three immature specimens of a second *Nauphœta*, which is evidently the *Blatta lævigata* of Palisot de Beauvais.

HEMIPTERA.

Family PENTATOMIDÆ.

Nezara viridans Stål., Freg. Eugenie Resa. Ins., p. 228, No. 21.

Two specimens were secured on Chatham Island.

Family HYDROBATIDÆ.

Halobates wuellerstorfi Frauenf., Verh. Zool. Bot. Gesell., v. 17, 458. B. White, Challenger Exped. Zool., v. VII, p. 40, pl. 1, fig. 1.

Numerous specimens were collected from the surface of the ocean near the Galapagos Islands and south as far as latitude 23°, and also in the Caribbean Sea. A variety of the female at Chatham Island.

NEUROPTERA.

Family LIBELLULIDÆ.

Four specimens of the genus *Æschna* from Chatham Island and one specimen of the genus *Tramea* from Albemarle Island. No species of the *Libellulidæ* are described from the Archipelago, but these strong flyers may belong to the continental species.

LEPIDOPTERA.

Family NYMPHALIDÆ.

Agraulis vanillæ Linn. var. *galapagensis* Holland.

The form of *A. vanillæ* in the collection ticketed "Chatham Island" differs in some respects so decidedly from the typical form as to well deserve a varietal name. It is characterized by its smaller size, by the darker and more fuscous tint of the basal half of the wings, by the great increase in breadth of all the black markings on both surfaces, and the almost entire obliteration of the white dots by which the spots in the cell on the upper surface of the primaries are pupiled in typical specimens.

One specimen, Galapagos, Chatham Island.

Family PAPILIONIDÆ.

Callidryas eubule Lin. (*Pap. e.*), Syst. Nat., I, 2, p. 764.

Four ♂ ♂; one ♀. Chatham Island.

Two ♂ ♂. Charles Island.

Differs in no respect from the forms taken commonly in the Southern United States and West Indies.

Family HESPERIDÆ.

Thymele sp. nov. ?

Near *T. santiago* Lucas (*Eudamus s.*), Sagra Hist. Cuba, VII, p. 623; but differing decidedly on the under surface.

The specimen is in very poor condition. Labeled "Chatham Island."

Family SPHINGIDÆ.

Deilephila lineata Fab., Ent. Syst. III, 1, p. 368, 39. Smith-Abbott, Lep. Ins. Georgia, pl. 39.

One example, ♂. "Galapagos, Charles Island."

(The collection contains a specimen of the genus *Protoparce* labeled "Galapagos, Charles Island," which is too badly worn to permit of a proper description, but which is sufficiently well preserved in part to indicate that it is not referable to any species known to the writer. A careful examination of the "Species Générale" and of Mr. A. G. Butler's revision, and a reference to all of the subsequent literature accessible, fails to disclose a description or a figure applicable to the species. It comes near to *Ochus*, Klug, yet seems to be distinct. Holland.)

Protoparce cingulata Fabr., Syst. Ent., 545.

(A very badly worn female of this species is contained in the collection and labeled, "Galapagos, Chatham Island." The species is distributed from Canada to Uruguay, and from Massachusetts to the Hawaiian Islands. Its occurrence in the Galapagos is an interesting fact. Holland.)

Protoparce calapagensis sp. nov. (Holland.)

UPPER SURFACE.—Anterior wings white, traversed by double, undulate, black transverse anterior, posterior, and submarginal lines, the latter terminating near the exterior angle in a conspicuous black spot. A row of marginal black spots, those nearest the apex protracted in the form of dashes; the second from the apex, coalescing with the submarginal line, further ornaments the wing. Fringes white, interrupted at the end of the nervures by black. The discal dot is pure white, large, narrowly margined with black. Upon the costa, near the base, is a black dash, followed by some confused "pepper and salt" markings near the transverse anterior line. Posterior wings gray, shading into white at anal angle, and traversed by three black bands, of which the two on the discal space are narrow, while the submarginal band is broader, widening rapidly from the anal angle toward the anterior margin. Head, antennæ, and thorax white. Patagiæ white, marked in the middle with a deep black curved line extending from the insertion of the anterior wings about two-thirds of their length. Abdomen light gray, almost white, ornamented by two large tufts of black hair at base, and by a narrow dorsal line consisting of a black dash upon each segment. Each segment is further margined by a transverse line of black at its insertion, and the second, third, and fourth are marked by lateral spots of pale yellow surrounded with black.

UNDER SURFACE.—Palpi, thorax, and abdomen snowy white. Upper ends of tibiæ and tarsi light brown, ringed with white. Wings gray, obscurely marked, and banded as on upper surface.

Expanse of wings, 90^{mm}.

Described from one female specimen in fair condition, labelled "Galapagos, Charles Island."

Also five Sphingid larvæ of as many different species, of which three are from Chatham Island, one from Duncan Island, and one from Indefatigable Island.

Family BOMBYCIDÆ.

Utetheisa bella Linn. var. **ornatrix** Linn.

One damaged example labeled "Galapagos, Chatham Island."

Family NOCTUIDÆ.

Two examples of the genus *Pseudaglossa*, one defective specimen of the genus *Zanclognatha*, and three examples of another genus of this family were collected at "Galapagos, Chatham Island."

There are three larvæ belonging to a species of *Catocala* from Duncan Island, also eight larvæ of a species near *Alysia*, one larva near *Prodenia*, and a Noctuid pupa from Chatham Island, and one larva near *Hydrœcia*, from Indefatigable Island.

Family PYRALIDÆ.

One example of the genus *Crambus* from "Galapagos, Chatham Island."

The collection also contains a specimen from Chatham Island, denuded of scales, and so torn as to be wholly indeterminable.

Family GEOMETRIDÆ.

One specimen of a Geometrid larva collected on Chatham Island.

The collection also contains an unexpanded example of some species of *Ægeria*, evidently killed as it was emerging from the chrysalis, and labeled "Galapagos, Chatham Island."

HYMENOPTERA.

Family FORMICIDÆ.

A dark-colored species of the genus *Camponotus* was collected, one male from Albemarle Island, numerous males and two females from Charles Island.

Of a light-colored species of the same genus seven males were taken on Charles Island, and one male on Albemarle Island.

Family APIDÆ.

Two females of the genus *Xylocopa* of a purple-black color, even the wings, were taken on Indefatigable Island. On this island was also collected a male specimen that may be of the same species. It has transparent wings, and the body is covered with pale rufous hairs.

DIPTERA.

Family CULICIDÆ.

Twelve specimens of the genus *Culex* were collected, of a luteous color, with blackish mesonotum.

CHILI AND STRAITS OF MAGELLAN.

COLEOPTERA.

Family CICINDELIDÆ.

Agrius fallaciosus Chevr., Ann. Fr., 1854.

A specimen was collected on Elizabeth Island of this rare and exceedingly interesting form. It occurs only at the straits, and is the only South American representative of the group to which our genera *Amblych ila* and *Omus* belong.

Family CARABIDÆ.

Carabus suturalis Fab.

Three specimens from Sandy Point, and one from Laredo Bay, of this species. It occurs also in Chili, and is of a graceful form and brilliant color, like the other Chilian species of *Carabus*. Some authors separate them into the genus *Ceroglossus*.

Migadops ovalis Waterh., Ann. Nat. Hist., 1842.

One specimen from Laredo Bay. The genus is peculiar to Patagonia and the Falkland Islands.

Six different species belonging to the genus *Antarctia* were collected. Two specimens of one species were caught on board near Chiloe, another pair of a different species on board a long distance southwest from Chiloe. At Sandy Point were taken nineteen specimens of three species, and at Laredo Bay two specimens of the sixth species. The species are so nearly allied, and so large a number have been described from Chili and Patagonia, that it is not safe to identify them without comparison with the types. In the far south they replace our Amaras and resemble them greatly, but are easily distinguished by having two impressed punctures on the apical half of the elytra, while the Amaras have none.

Agonum gayi Sol., Gay Hist. Chil., IV.

Three specimens from Sandy Point of this Chilian species.

Pristonychus chilensis Gory, Ann. Fr., 1833.

One specimen from Lota, Chili, of this form considered a variety of the European *Pr. complanatus* Dej.

Tetraodes lævis Blanch., Voy. Pole Sud, 1853.

Four specimens from Gregory Bay, and two from Sandy Point, of this large, shining, Broscus-like species, which is peculiar to the straits.

Family DYTISCIDÆ.

Lancetes præmorsus Er.

One specimen from Sandy Point of this Chilian species. The genus *Lancetes* occurs in southern South America and Australia.

Family SILPHIDÆ.

Necrodes biguttulus Fairm., Rev. ? Zool., 1859.

One specimen from Elizabeth Island of this fine species which is peculiar to the straits.

Family ELATERIDÆ.

Agriotes magellanicus Blanch., Voy. Pole Sud, 1853.

One specimen from Sandy Point.

An Elaterid larva was found at Port Churruca, and a Lampyrid larva at Latitude Cove, Patagonia.

Family COCCINELLIDÆ.

Adalia angulifera Muls.

One specimen, Tomé, Chili.

Family LUCANIDÆ.

Sclerognathus femoralis Guér., Rev. Zool., 1839.

Fourteen specimens from Sandy Point of this interesting Dorcus form, which also occurs in Chili.

Family SCARABÆIDÆ.

Macrosoma glaciale Fab.

One specimen of this species, peculiar to the straits, from Sandy Point.

Maypa viridis Sol., Gay. Hist. Chil.

Six specimens from Sandy Point of this brilliant Chilian species. At Gregory Bay was found a specimen of a *Rutelinid* which can not safely be identified without comparison.

Also three Lamellicorn larvæ from Sandy Point.

Family CERAMBYCIDÆ.

Microplophorus magellanicus Blanch., Voy. Pole Sud, 1853.

A *Prionid*, resembling our *Tragosoma*. One specimen from Sandy Point.

Family TENEBRIONIDÆ.

Phaleria gay Lap., Hist. Nat., II.

Four specimens from Lota, Chili.

Nyctelia multicristata Blanch., Voy. Pole Sud, 1853.

Eight specimens from Gregory Bay, and one from Elizabeth Island, of this large, beautiful species, found only at the straits.

Emalodera obesa Guér., Rev. Zool., 1841.

Nine specimens Gregory Bay, three Elizabeth Island, and one from Sandy Point—peculiar to the straits.

Platesthes depressa Guér., Rev. Zool., 1841.

One specimen of this curious little species from Gregory Bay.

Family CURCULIONIDÆ.

Cylindrorrhinus angulatus Guér., Rev. Zool., 1841.

Thirteen specimens of this large, interesting species were captured at Gregory Bay. Peculiar to the Magellan region.

Rhyephenes lævirostris Sol., Ann. Fr., 1839.

Two specimens from Sandy Point of this Chilian species.

Eublepharis (Lophotus) vitulus Fab.

Sandy Point, four specimens, and one from Laredo Bay. It is a very conspicuous species.

A specimen of a smaller species of the genus *Lophotus* was obtained at Sandy Point.

Three other species of Rhyncophorus beetles were collected at Sandy Point, nine specimens of one, and one specimen of each of the two others. As they have no other striking peculiarities they can not very well be identified from the old descriptions alone in this extremely difficult group.

ORTHOPTERA.

Family FORFICULIDÆ.

Anisolabis chilensis? Blanch.

Here is placed, with some doubt, a mutilated specimen collected at Gregory Bay. Books of reference for this group of insects are not numerous, many of the species being without descriptions, occurring only in catalogues.

Family LOCUSTIDÆ.

Stenopelmatus chilensis? Sauss.

A single male specimen of a large, cricket-like *Locustida*, from Lota, Chili, appears to belong here. The structural character of the prosternum will, however, necessitate its removal from that genus as limited.

Family ACRIDIIDÆ.

Bufonacris terrestris Walk.

The most remarkable orthopterous insect among the lot is the large wingless *Bufonacris terrestris* of Walker. Not only is it of interest on account of its odd appearance, but also from the fact of its having been recorded a second time from the Straits of Magellan. Saussure, in his "Additamenta ad Prodromum Œdipodiorum" (p. 160, foot-note), discredits Walker's citation of the habitat of this locust. It is a barren ground form, and is closely allied to our genus *Haldemanella*. Its occurrence at a point so widely removed from the subtropical region certainly is an anomaly. Four specimens from Gregory Bay.

Another exceedingly interesting form from Gregory Bay is represented by six specimens of a small *Truxalid* belonging to a genus very closely related to *Oxycoryphus* in its general appearance, but differing greatly from that genus in being entirely apterous, and in having the body ridged or corrugated as in the genus *Phrynotettix* Sauss. among the *Eremobites*.

HEMIPTERA.

Family PENTATOMIDÆ.

Ditomotarsus hyadesi Signoret, Ann. Soc. Ent. Fr., 1885, p. 64.

An immature male specimen from Sandy Point.

Family ARADIDÆ.

Isodermus patagonicus Stål (*Mezira?*), Eugenie Resa, Ins., p. 260, No. III.

One specimen, a male, was collected at Sandy Point. It has fully developed wings.

NEUROPTERA.

Family ODONATA.

Æschna diffinis Ramb., Histoire des Neuroptéres, 1842.

Two specimens of this species were caught at Island Harbor, Patagonia.

One specimen collected at Latitude Cove belongs to the genus *Diplax*.

At Mayne Harbor, Patagonia, was taken a Libellulid pupa.

Family LIMNOPHILIDÆ Ramb. 1842.

Halesus hyadesi J. Mabille, Mission Scientif. du Cap Horn, 1888.

One specimen captured at Gregory Bay. Above-named French expedition in 1883 records also only one specimen (from Orange Bay), and the species must be considered sufficiently rare, only one specimen for each hemisphere.

LEPIDOPTERA.

Family NYMPHALIDÆ.

Argynnis cytheris Drury (*Pap. C.*), Ill. Ex. Ent., II, pl. IV, fig. 3, 4. *A. siga* Hübn., Zutr. Ex. Schmett, fig. 677, 678. *A. anna*, Blanch., Gay Faun. Chili, VII, p. 23, ♀. *A. lathonioides* Blanch., Gay Faun. Chili, VII, p. 22, pl. II, fig. 1, 2.

I give what appears to me to be the correct synonymy of this species. The specimens of *anna*, and its female *lathonioides*, in my collection, which were determined for me by Dr. Staudinger, and which agree with Blanchard's description, certainly agree also with the figure of Drury's *cytheris* as closely as possible, and Drury's figure is admitted by Mr. Kirby, in his Synonymic Catalogue, to represent the same insect figured at a later date by Hübner as *siga*.

Five males (*Anna*), and one female (*Lithonioides*), labeled "Straits of Magellan, Gregory Bay."

Family PAPILIONIDÆ.

Pieris xanthodice Lucas, Rev. Zoolog., 1852, p. 337.

One specimen, ♂, "Straits of Magellan, Gregory Bay."

A dozen larvæ of a Diurnal were taken at Sandy Point.

Family BOMBYCIDÆ.

Saturnia rubrescens Blanch.

One female, labeled "Western Patagonia."

Hemileuca hyadeti Mabille. (*Saturnia hyadeti.*)

One male, labeled "Western Patagonia."

Ecpantheria indecisa Walker. *E. bonariensis* Boisd. Oberthür, Études Ent. VI, pt. IV, p. 111, pl. XVIII, fig. 4 and 7.

One male, labeled "Straits of Magellan, Gregory Bay."

Family NOCTUIDÆ.

Six examples representing five species of the genus *Agrotis* are labeled as collected at "Western Patagonia," "Lota, Chili," and "Straits of Magellan, Gregory Bay."

There is also one example of the genus *Mamestra* and three examples of the genus *Leucania* from "Straits of Magellan, Gregory Bay."

Three larvæ of a *Noctuid* near *Plusia* are from Sandy Point, also two Noctuid pupæ were collected at the same place.

Family PYRALIDÆ.

Botys tedra? Cram., Pap. Exot., pl. 6, 312.

One example. "Lota, Chili."

Three examples of the genus *Ciambus* are from "Straits of Magellan, Gregory Bay."

The collection contains besides these a specimen from Gregory Bay denuded of scales and so torn as to be wholly indeterminable.

HYMENOPTERA.

Family ICHNEUMONIDÆ.

A specimen of the genus *Amblyteles* and a brilliant colored specimen of a *Stilpnus* were found at Gregory Bay.

Family FORMICIDÆ.

A female specimen of the genus *Camponotus* was captured at Lota, Chili.

Family POMPILIDÆ.

Three specimens of a *Pompilus* were found at Gregory Bay.

Family APIDÆ.

Bombus chilensis Spin., Gay, Hist. Chil.

Of this very large Chilian species two specimens were taken at Borja Bay.

Family VESPIDÆ.

Odynerus vespiformis Halid.

One specimen from Sandy Point.

DIPTERA.

Family TIPULIDÆ.

Two specimens of the genus *Pachyrhina* were taken at Straits of Magellan.

Family TABANIDÆ.

Two specimens, each of a different species of *Tabanus* are from the Straits of Magellan.

Family ASILIDÆ.

Two females and one male of the genus *Asilus* are from the Straits of Magellan (Gregory Bay). The species would be located in the genus *Philodicus*, save for the absence of spines at the tip of the very short conical ovipositor. The abdomen is brownish-gray, with three rows of rounded brown spots; the wings hyaline, with small clouds on the basal cross-veins, anterior cross-vein, and furcation of the third.

Family SYRPHIDÆ.

Dolichogyna nigripes Bigot, Ann. Soc. Ent. Fr., 1884, 346, Chili.

One female specimen from the Straits of Magellan. The description applies sufficiently well, but it is not impossible that the form is only a variety of *D. fasciata*, Macq., described from this region by Bigot, as

Helophilus hahni (Mission Sc. Cap Horn, Dipt. vi, Div. 24, pl. III, f. 6). The legs are deep black, with the extreme tip of the femora and the basal third of the tibiæ yellow. The antennæ are black throughout, and the inner mesonotal stripes are slender. It is a little queer that two such allied species should have so wide a habitat in common.

Family SARCOPHAGIDÆ.

Two small specimens, each of a different species of the genus *Sarcophaga* and of the ordinary types, are from the Straits of Magellan.

The collection also contains a specimen of a *Tachinid* from the Straits of Magellan that I can not locate in any genus known to me.

Family MUSCIDÆ.

Lucilia (Compsomyia) macellaria Fabr. Scrw-worm fly.

The synonomy of this species is as follows:

- *Musca macellari* Fabricius, Syst. Ent., 776, 14; Ent. Syst., iv, 319, 28; Syst. Antl., 292, 42; Olivier, Encycl. Méth. viii, 14, 14; Wiedemann, Auss. Zw. Ins., ii, 405, 36; Macquart, Dipt. Exot., ii, 3, 147, 28, pl. xvii, f. 9 (*Lucilia*); Lynch, Arribalzaga, El. Nat. Agr., i, 187 (*Calliphora*); Annales Soc. Cient. Arg., x, 70, et seq. (*Compsomyia*); ibid., 248, et seq. (id.).
- *Lucilia vitatta* Macquart, Dipt. Exot., ii, 3, 141, 10, pl. xvii, f. 10.
- *Caliphora fulvipes* Macquart, Dipt. Exot., ii, 3, 132, 13, pl. xvi, f. 3; Blanchard in Gay's Hist. de Chile, vii, 434, 4; Schiner, Nov. Exped., 309.
- *Chrysomyia bata* Walker, List, etc., iv, 875.
  - *combrea* Walker, op. cit., 876.
  - *fasciata* Walker, Dipt. Saunders, 330, 337.
  - *lyrcea* Walker, List, etc., iv, 873.
  - *verena* Walker, List, etc., iv, 874.
  - *caruca* Walker, List, etc., iv, 877.
  - *gamelia* Walker, List, etc., iv, 878.
- *Lucilia rubrifrons* Macquart, Dipt. Exot., 4. Suppl., 250, 56, pl. xxiii, f. 5; Rondani, Dipt. Merid. Am., lecta *P. strobeli*, 3, 10.
- *Lucilia hominivorax* Coquerel, Ann. Soc. Ent. Fr. (3), vi, 1858, 173, pl. iv, f. 2; vii, 1859, 233, pl. vi, f. 1; Laboulbéne, Bull Soc. Ent. Fr. (4), viii, 1860, 36; Lucas, ibid., 40.
- *Calliphora infesta* Philippi, Zeitschr. f. Ges. Naturw., xvii, 513.
- *Calliphora annulipes* Philippi, Zeitschr. f. Ges. Naturw., xvii, 514.
- *Chrysomya viridula* R. Desvoidy, Essai sur les Myod., 445.
  - *affinis* R. Desvoidy, l. c.
  - *tibialis* R. Desvoidy, op. cit., 446.
  - *l'herminieri*, l. c.
  - *alia* R. Desvoidy, op. cit., 447.
  - *cœrulescens* R. Desvoidy, l. c.
  - *socia* R. Desvoidy, l. c.
  - *decora* R. Desvoidy, op. cit., 48.
  - *placi* R. Desvoidy, l. c.
  - *lepida* R. Desvoidy, l. c.
  - *fulvicrura* R. Desvoidy, op. cit., 416.
- *Somomya annulipes* (*? Lucilia*) Phil. Rondani, Arch. per la Zool., etc., iii, 30.
- *Calliphora anthropophaga* Conil, Act. Ac. N. C. Ex., iii, 41, 1878.

The above synonomy of this interesting fly is reproduced almost wholly from "Lynch Arribálzaga." I have compared a considerable number of the descriptions, and have found no reason to seriously doubt any, though it is true that an exhaustive study of the allied forms from both North and South America may possibly entitle a few of the names to specific rank. The red or reddish hind femora and tibiæ have furnished ground for some of these names, and Lynch recognizes two varieties, which may properly be called *Macellaria genuina* and *Macellaria fulvipes* Macquart. These lighter-colored specimens occur among the material from both Montevideo and the United States. Among these ten specimens there is a great difference in size, agreeing in this respect also with those from North America. I have seen the species from all parts of the United States, and from Canada and Mexico, as well as Brazil. It seems to occur over the whole of both continents. Twenty-seven specific names is rather an unusual number for a fly to be burdened with.

MONTEVIDEO AND URUGUAY.

COLEOPTERA.

Family CARABIDÆ.

Calosoma bonariense Dej.

A single broken specimen of this species. It resembles our *C. sayi* in habitus, but belongs to a different group of the genus.

Platysma striatulum Fab.

One specimen. A large, smooth, and greenish species.

Family STAPHYLINIDÆ.

Staphylinus tristis Blanch.

One poor specimen.

Family TENEBRIONIDÆ.

Two specimens of a large species belonging to the tribe *Blaptini*.

HEMIPTERA.

Family PENTATOMIDÆ.

Nezara armigera Stål., Freg. Eugenie, resa. Ins., p. 229, No. 24. Enum. Hemipt., II, p. 43, No. 19.

Two specimens were collected.

NEUROPTERA.

Family ODONATA.

Six specimens of a species belonging to the genus *Cynacantha* were captured.

Family HEMEROBIIDÆ.

One specimen of the genus *Chrysopa*.

LEPIDOPTERA.

Family NYMPHALIDÆ.

Junonia genoveva Cram. var. **hilaris** Felder, Reise Nov., Lepidoptera, III, p. 400.

A fragmentary specimen of the female ticketed "Montevideo."

Family LIPARIDÆ.

There are two examples of a moth structurally near to *Orgyia* Ochs., but unknown to me, and which, without much labor, I could not determine. These are labeled "Montevideo."

HYMENOPTERA.

Family ICHNEUMONIDÆ.

One specimen of the genus *Anomalon*.

Family VESPIDÆ.

Odynerus argentinus Sauss.

One specimen collected.

BRAZIL (BAHIA AND ABROLHOS ISLANDS).

COLEOPTERA.

Family ELATERIDÆ.

Two specimens of an Elaterid larva were collected on Abrolhos Islands.

ORTHOPTERA.

Family GRYLLIDÆ.

Scapteriscus vicinus Scudd.

There is a specimen of a mole-cricket belonging to Scudder's genus *Scapteriscus* which is characterized chiefly by having two claws upon the tibiæ, instead of four to the front or digging feet. This specimen from Bahia and another specimen from St. Lucia are of the species called *vicinus* Scudder.

Family ACRIDIIDÆ.

Rhomalea miles Drury.

Nine specimens of this highly-colored locust were taken at Bahia. They are all immature.

Scyllina peregrans Stål.

There are also three specimens of a locust that is made out to be this insect. It is a much slenderer species than the *Scyllina viatoria* Sauss., and approaches our *Syrbula admirabilis* (Uhler) in its general appearance. Two mature individuals and one pupa from Abrolhos Islands, off the east coast of Brazil.

Family LOCUSTIDÆ.

Conocephalus subulatus? Boliv.

The collection contains a single larva of a Conocephalus from Abrolhos Islands which is probably *subulatus* Bolivar.

LEPIDOPTERA.

Family BOMBYCIDÆ.

A Bombycid larva was taken at Bahia.

Family NOCTUIDÆ.

Erebus odora Linn.

One battered example of this gigantic Brazilian moth "came on board ship in the night after leaving the Abrolhos Islands, December 28, 1887." It is a strong flyer, and is sometimes taken as far north as New York City.

A Noctuid larva, near *Aletia*, was collected at Bahia.

HYMENOPTERA.

Family APIDÆ.

There is a very poor specimen of a bee belonging to some one of the genera peculiar to South America, collected at Bahia.

DIPTERA.

Family HIPPOBOSCIDÆ.

One specimen of the genus *Olfersia* bears the label "Abrolhos Islands, December 28. This insect flew on board when we were three miles from the island." It had probably escaped from some bird flying in the vicinity.

ST. LUCIA.

COLEOPTERA.

Family STAPHYLINIDÆ.

One specimen of the genus *Lathrobium*.

Family LAMPYRIDÆ.

One specimen of the genus *Pyractomena*.

Family SCARABÆIDÆ.

Ligyrus tumulosus Bur.

One specimen.

ORTHOPTERA.

Family GRYLLIDÆ.

Gryllotalpa hexadactyla Perty.

Fifteen specimens are referable to this species.

Scapteriscus vicinus Scudd.

One specimen.

NEUROPTERA.

Family ODONATA

Lestes simplex Hagen.

One specimen.

One specimen of the genus *Libellula*.

LEPIDOPTERA.

Family NYMPHALIDÆ.

Anartia jatrophæ Lin. (*Pap. j.*), Mus. L. U. R., p. 289.

Two defective specimens labeled "Port Castries, St. Lucia."

Family SPHINGIDÆ.

A larva collected that belongs here.

HYMENOPTERA.

Family FORMICIDÆ.

Numerous male specimens of an undetermined specie of the genus *Lasius*. A portion of a nest of a tree-ant was also taken.

Family POMPILIDÆ.

Pepsis ornata Say.

One specimen.

Family APIDÆ.

One specimen of the genus *Xylocopa*

ARACHNIDA.

BY GEORGE MARX, M. D.

The steamer *Albatross* collected *Arachnida* at the following five principal points:

(1) Abrolhos Islands, off the Brazilian coast, December 28.

(2) At the Straits of Magellan at three points: Gregory Bay, January 18; Laredo Bay, January 22; and Sandy Point, January 27.

(3) At the Galapagos Islands, as follows: Chatham Island, April 4; Charles Island, April 8; Albemarle Island, April 10; James Island, April 11; Indefatigable Island, April 12; and Duncan Island, April 13.

(4) In Lower California: St. Margarita Island, May 2; Balenas Bay, May 3; and Cerros Island, May 5.

(5) In California: Clemente Island.

The total result of these collections was thirty-seven species of *Araneæ* and six species of Scorpions.

The following list contains the *Araneæ*, arranged according to their classification:

Family EPEIRIDÆ.

1. Gasteracantha insulana Thor.
2. Gasteracantha canoriformis Lin.
3. Gasteracantha velitaris Koch.
4. Argiope argentata Fabr.
5. Epeira cooksonii Butler.
6. Epeira flaviventris Nicolet.
7. Epeira labyrinthea Hentz.

Family THERIDIDÆ.

8. Linyphia (Dyplostylum) magellanii nov. sp.
9. Latrodectus scelio Thor.
10. Latrodectus mactans Walk.
11. Latrodectus apicalis Butler.

Family SCYTODIDÆ.

12. Loxosceles galapagoensis sp. nov.

Family THOMISIDÆ.

13. Thanatus antarcticus sp. nov.

Family SPARASSIDÆ.

14. Selenops aissa Walk.
15. Heteropoda venatoria Lin.

Family AGALENIDÆ.

16. Agalena (immature).
17. Tegenaria morsitans sp. nov.

Family AMAUROBIDÆ.

18. Amaurobius frigidus sp. nov.

Family DRASSIDÆ.

19. Drassus pacificus sp. nov.
20. Gayenna rosea sp. nov.
21. Clubiona brevipes sp. nov.
22. Zora californica sp. nov.
23. Zora latithorax sp. nov.

Family LYCOSIDÆ.

24. Lycosa fallax sp. nov.
25. Lycosa fuegiana sp. nov.
26. Lycosa ornata sp. nov.

Family CTENIDÆ.

27. Ctenus obscurus sp. nov.

Family ATTIDÆ.

28. Phidippus morsitans (found on board of the ship).
29. Menemerus galapagoensis sp. nov.

Family DYSDERIDÆ.

30. Segestria galapagoensis sp. nov.

Family FILISTATIDÆ.

31. Filistata capitata Hentz.
32. Filistata hibernalis Hentz.
33. Filistata oceanea sp. nov.

Family THERAPHOSIDÆ.

34. Cyclosternum schmardæ Auss.
35. Cyrtauchenius similis L. Koch.
36. Lasiodora striatipes Auss.
37. Eurypelma rapax Auss.

The spiders collected at the Abrolhos Islands bear a general South American character; they are eight species, five of which are known and have been previously described; one, the *Epeira labyrinthea* Hentz, is of special interest, for it is an inmate of the United States, where it is found as high north as the State of Maine, and is, as far as our knowledge of the geographical distribution of *Arachnida* in the United States goes, confined to the Atlantic States, from Maine to Florida. It has also been collected on the Bermuda and West India Islands and in California.

The following are the names of the spiders collected at Abrolhos Islands:

1. Epeira labyrinthea Hentz.
2. Cyclosternum schmardæ Auss.
3. Cyrtauchenius similis L. Koch.
4. Lasiodora striatipes Auss.
5. Eurypelma rapax Auss.
6. Tegenaria morsitans sp. nov.
7. Zora latithorax sp. nov.
8. Ctenus obscurus sp. nov.

The spiders collected at the STRAITS OF MAGELLAN represent a new and strange fauna, and, although on two former occasions collections have been made in the same region and the material described, we find in our material that seven out of the ten species are new to science. The three already described are *Epeira flaviventris* Nic., which has been described by Simon from a collection from Cape Horn and which was originally described by Nicolet from Chili in Gay's Hist. fisica y polit. de Chili. We find here also the *Epeira labyrinthea* Hentz. mentioned above. It is hardly recognizable, for its color has greatly changed; the dorsal folium is nearly obliterated, only two lighter spots at each side remain, and the whole body is covered with a long and dense pubescence. The third known species is the cosmopolitan form *Latrodectus mactans* Walck., occurring, as it seems, everywhere around the globe below a certain degree of latitude. The following is the list of species from the Magellan Straits:

a. Gregory Bay:
1. Epeira flaviventris Nic.
2. Latrodectus mactans Walck.
3. Amaurobius frigidus sp. nov.
4. Lycosa ornata sp. nov.
5. Thanatus antarcticus sp. nov.
6. Clubonia brevipes sp. nov.

b. Sandy Point:
7. Lycosa fuegiana sp. nov.

Sandy Point—Continued.
8. Linyphia magellanii sp. nov.
Latrodectus mactans Walck.

c. Laredo Bay:
9. Guyenna rosea sp. nov.
10. Epeira labyrinthea Hentz.
Lycosa fuegiana.
Epeira flaviventris.

The collection from the GALAPAGOS consists, unfortunately, of only ten species taken in the nine days the *Albatross* was present in that region. These ten species are representatives of eight families and therefore suggestive of a rich fauna. What a pity that more time could not be spent in collecting at such interesting points; but we are glad for the opportunity of a mere glimpse at the very interesting fauna of that group of islands.

The Galapagos Islands have been visited before, and H. M. S. *Petrel* collected natural history specimens extensively in 1875. Among these were the following seven *Arachnida*, which were described and delineated by Mr. Butler in the Proc. Zoöl. Soc. London, 1877:

1. Androctonus americus Linn.
2. Lycosa indomita Nic.
3. Gasteracantha insulana Thor.
4. Theridium carolinum Butler.
5. Latrodectus apicalis Butler.
6. Epeira cooksonii Butler.
7. Thomisoides utriformis Butler.

Of these, three are represented in our collection, viz, *Gasteracantha insulana*, *Epeira cooksonii*, *Latrodectus apicalis*. Two more specimens, previously described, were found among the species, viz: *Latrodectus scelio* Thorell (the renowned "Katipo" of New Zealand) and *Heteropoda venatoria*, a cosmopolitan in the equatorial and tropical regions.

A species which seems to live in great abundance on these islands is the *Epeira cooksonii* Butler; it is related to our *domiciliorum*, which has undergone on the Pacific coast already a change in its form and coloration, so that Dr. McCook has described it as new—*Ep. vertebrata.* In *Ep cooksonii* this change is increased, but still the relationship is preserved by the structure of the epigynum.

The following is a list of the material collected at the Galapagos group:

a. Chatham Island:
  1. Gasteracantha insulana Thorell.
  2. Epeira cooksonii Butler.
  3. Segestria æquatoria sp. nov.

b. James Island:
  Gasteracantha insulana Thorell.
  Epeira cooksonii Butler.

c. Charles Island:
  4. Latrodectus scelio Thorell (Katipo) (young).
  5. Agalena (immature).
  6. Loxosceles galapagoensis sp. nov.

Charles Island—Continued.
  7. Filistata oceanea sp. nov.
  8. Heteropoda venatoria Lin.
  Gasteracantha insulana Thorell.
  Epeira cooksonii Butler.

d. Albemarle Island:
  Epeira cooksonii Butler.
  Heteropoda venatoria.

e. Indefatigable Island:
  9. Menemerus galapagoensis sp. nov.
  10. Latrodectus apicalis Butler.

In the collection from Lower California we meet again with a majority of well-known species, as our *Epeira labyrinthea* Hentz.; *Gasteracantha cancriformis*, also found in the Southern States of the United States and in California; *Argiope argentata* Fabr., frequently collected in southern Florida, Texas, and California; *Gasteracantha velitaris* Koch, the crab spider of the southern Atlantic States; *Selenops aïssa* Walck., found in Key West, Fla., and the West Indies; *Filistata hibernalis* Hentz., from Alabama. The two new species are *Drassus pacificus* and *Zora californica.*

a. Cerros Islands:
  1. Drassus pacificus sp. nov.
  2. Epeira labyrinthea Hentz.

b. Ballenas Bay:
  3. Gasteracantha cancriformis Lin.
  4. Argiope argentata Fabr.

c St. Margarita Island:
  5. Gasteracantha velitaris C. Koch.
  6. Selenops aïssa Walck.
  7. Filistata hibernalis Hentz.
  8. Zora californica sp. nov.
  Epeira labyrinthea.
  Argiope argentata.

The material from Clemente Island, California, comprises four species, of which only one is new:

1. *Filistata capitata* Hentz., a common form in the Southern States.
2. *Latrodectus mactans* Walck., a species which had been caught also at the Straits of Magellan by the *Albatross*, and which is cosmopolitan.
3. *Argiope argentata*, several times mentioned above.
4. *Lycosa fallax*, a new species.

Résumé.

From—	Species.	New.	Already known.
Abrolhos Islands	8	4	4
Magellan Straits	10	7	3
Galapagos Islands	10	5	5
Lower California	8	2	6
California	4	1	3

The scorpions collected on this occasion are six in number of species, and belong to the three families into which the order of Scorpions is divided.

Family BUTHIDÆ.

1. **Centrurus biaculeatus** Luc.

From Panama; a species, cosmopolitan, and frequently found in countries bordering the Atlantic Ocean below 25° north latitude.

2. **Centruroides exilicauda** Wood.

From St. Margarita Island, Lower California; a common species in that region.

3. **Centruroides luctifer** sp. nov.

From Indefatigable Island, Galapagos; a very interesting species.

Family PANDINIDÆ.

4. **Vejovis galapagoensis** sp. nov.

From Chatham Island, Galapagos.

5. **Broteas formosus** sp. nov.

From St. Margarita Island, Lower California.

Family BOTHRIURIDÆ.

6. **Timogenes niger** sp. nov.

A mutilated and broken specimen from Montevideo, Uruguay.

This is, so far, the result of my investigation, and I hope to have an opportunity to describe and figure the new species of this interesting collection.

MYRIAPODA.

BY C. H. BOLLMAN.

1. Spirobolus sanctæ-luciæ sp. nov.

DIAGNOSIS.—Allied to *Spirobolus surinamensis* Bollman; but the horse-shoe-like markings only prominent along the middle line of segment; no deep sulcus behind repugnatorial pore; legs light yellow.

Type.—No. 590.

HAB.—Port Castries, St. Lucia, Windward Islands.

Description.—Segments dark brown, posterior borders lighter; anterior margin of first pale; head and first dorsal plate greenish; antennæ pale brown; legs very light yellow (pale), probably red in life.

Rather slender, anterior segments attenuated.

Venter slightly reticulated, sulcus very indistinct; clypeus not deeply excised, foveolæ 2+2, distant, sulcus shallow.

Antennæ slenderer than in *surinamensis*, hardly reaching second segment.

Ocelli about 40, in a series, patch suboval.

Segments shining, rather smooth, especially posteriorly; anterior ten segments with distinct concentric striæ on basal part; posterior part, especially on anterior segments, sulcate beneath; division of segments not evident, a hollow depression along which are horseshoe-like depressions; these are scattered over the dorsal part of segments, but are small and shallow; the posterior four segments almost destitute of markings.

First segment narrowed laterally, anterior margin concave, a strong marginal sulcus.

Anal segment obtusely angled, not surpassing valves; anal valves narrowly margined, reticulated; anal scale very slightly rounded, almost transverse.

Repugnatorial pore large, situated in hollow on anterior part.

Legs extending slightly beyond sides of body.

Segments 50.

Length of body 45^{mm}; width 3.4^{mm}. This species is described from an adult female; in the same vial is a very young specimen, showing only 41 segments. In Karsch's "*Neue Juliden des Berliner Museum*" this species would stand near *Spirobolus biconicus* from Mauritius.

2. Himantarium tæniopse (Wood).

No. 599, Margarita Island, Lower California; ♀.

A young specimen. Pairs of legs, 148.

3. Pectiniunguis americanus gen. et sp. nov.

DIAGNOSIS.—Related to *Schendyla eximia* Meinert; but the anal pair of legs jointed and the claw of maxillary palpus pectinate along its entire under side.

Type.—No. 598.

HAB.—Pichilingue Bay, Gulf of California.

Description.—Orange, darkest anteriorly; legs pale.

Robust, scarcely attenuated anteriorly, more posteriorly.

Segments not polished, very finely reticulate; sparsely pilose.

Prehensorial legs not reaching base of antennæ; sternum almost twice as wide as long, anterior margin slightly callous; coxæ of about equal length and width, unarmed, anterior margin not much sinuate.

Cephalic plate slightly longer than wide; basal plate three times as wide as long; pre-basal plate exposed. Antennæ filiform, rather long.

Dorsal plate manifestly bisulcate.

Spiracles suboval, longitudinal, anterior largest.

Ventral plates not sulcate; porous area suboval, much smaller on posterior segments; last ventral plate very wide, pilose, sides converging.

Posterior pleuræ large, pilose; pores large, concealed.

Anal pair of legs 6-jointed, moderately crassate, joints all large, densely pilose; unarmed.

Pairs of legs ♀ 65.

Length 50^{mm}; width 1.55^{mm}.

This species is described from an adult female.

According to Meinert's diagnosis of the genus *Schendyla* this species would be included under that genus; but the three known species may be separated by the following generic characters:

a. Claw of maxillary palpus not pectinate, outer part of first pair of maxillæ without a trace of a lateral process; labrum entirely united, teeth 20-22, equal; anal legs 6-jointed .... *Nemorensis.*

aa. Claw of maxillary palpus pectinate; outer part of first maxillæ with a small lateral process; labrum free in the middle.

b. Anal pair of legs 5-jointed; claw of maxillary palpus only pectinate under the apex; labral teeth about 15, equal; first joint of anal legs almost coalesce with second .... *Eximia.*

bb. Anal pair of legs 6-jointed; claw of maxillary palpus pectinate for its entire length; labral teeth 8+10+8, the outer enlarged; first joint of anal legs not coalesced with second .... *Americanus.*

On account of these generic differences between the three species, especially between the first and the last two, I have thought it best to place *americanus* and *eximia* under the new genus *Pectiniunguis*, of which *americanus* is the type, restricting *Schendyla* to *nemorensis.*

The generic differences between *americanus* and *eximia* are no doubt worthy of subgeneric rank, and I therefore propose the name *Nannopus* for the reception of *eximia.*

4. Scolopendra macracanthus sp. nov.

DIAGNOSIS.—Allied to *Scolopendra subspinipes* Leach; but the femora of anal legs armed beneath with *three* spines, of which the two anterior are very large, the superior-interior surface armed with six spines; the first *nine* dorsal plates immarginate.

Type.—No. 165F.

HAB.—Pacific coast, some place between Lower California and Straits of Magellan.

Description.—Brownish-green; tip of antennæ and lateral parts of dorsal plates green; head and first dorsal plate darker.

Rather slender, smooth, only lightly punctate anteriorly.

Head suborbicular, punctate, not sulcate.

Antennæ, 18-jointed; articles moderate, the first six not hirsute.

Prosternal teeth 5+5, the inner two small and coalesced; coxal tooth large, apex carinate, nodule present.

Dorsal plate, except the first nine (10), marginate; sulci beginning at the third and indistinct on the posterior; posterior border transversely wrinkled.

Sulci of ventral plates distinct; last ventral plate long and narrow, sides converging, posterior border rounded.

Second torsal joint of all the legs, except anal, armed beneath with a spine.

Anal legs long, slender; femora, with six spines on the superior-interior surface, arranged in three series; three beneath, uniseriate, the anterior two largest; apical process bifid.

Posterior pleuræ densely porose; angular process small, bifid.

Length 120mm.

In the collection is a specimen without a more definite locality than "Pacific coast."

The following key will help to separate it from the related species:

Femora of penultimate pair of legs unarmed; first dorsal plate without a transverse furrow; tarsal joints armed.

a. Femora of anal legs unarmed beneath, two spines within; the first 6–11 dorsal plates immarginate; last two tarsal joints unarmed .... *Dehaani.*

aa. Femora of anal legs armed beneath.

b. Spines of femora of anal legs 4–6, always two beneath; the first four or five dorsal plates immarginate; the last or the last two tarsi unarmed. *Subspinipes.*

bb. Spines of femora of anal legs 9, 3 beneath; the first nine dorsal plates immarginate; the last tarsal joint unarmed .... *Macrocanthus.*

5. Scolopendra microcanthus sp nov.

DIAGNOSIS.—Allied to *Scolopendra pernix* Kohlrausch, but the anal pair of legs slender, spines small, and more numerous.

Type.—No. 600.

HAB.—St. Margarita Island, Lower California.

Description.—Pale green, posterior border of segments dark; prehensorial legs orange.

Slender; smooth, very lightly punctate.

Head suboval, punctate; sulci absent.

Antennæ 25–29-jointed, long, basal not very crassate, the first 3 or 4 smooth.

Prosternal teeth 4+4 inner coalesced; coxal tooth large, inner margin unarmed.

The first 15 dorsal plates immarginate; sulci well developed, and commencing at transverse suture of first plate and dividing them into three planes.

Sulci of ventral plates shallow, last plate short and wide, sides converging, rounded, posterior margin emarginate.

Second tarsal joints of all legs, except anal, armed.

Anal pair of legs slender as in *heros;* spines very small; 8–12, in 3 or 4 series on the superior-interior surface; 4 or 5 in 2 series on the inner surface; beneath 10–12 in 2 or 3 series; apical process large and blunt, armed with 9–11 small spines.

Posterior pleuræ narrow; apex long, armed with 7–9 spines, posterior margin concave; a marginal spine.

Length 75^{mm}.

Described from one specimen of which the anal pair of legs is broken off.

This new species is separated from *heros*, *pachypus*, *nicaraguensis*, and *viridis* by the large number of spines of apical process of femora and the well-marked sulci of first dorsal plate.

6. Scolopendra galapagoensis sp. nov.

DIAGNOSIS.—Related to *Scolopendra viridicornis* Newport, but the spines of apical process of femora of anal legs, 6–8; spines of apex of posterior pleuræ, 9–12; spines of femora of 2–20 pairs of legs, 4 or 5.

Type.—No. 594.

HAB.—Chatham, James, and Albemarle Islands, Galapagos Archipelago.

Description.—Very dark brown, more yellowish posteriorly; under parts more brown than upper; the first five or six antennal joints dark blue, rest rusty; tarsi brownish, rest of legs bluish-brown, except base of femora, which is more brown, like ventral plates; posterior pleuræ and femora of anal legs reddish-brown.

Robust, smooth, all parts very slightly punctate.

Head suboval; two longitudinal sulci, which break up posteriorly, and send a branch along lateral margin.

Antennæ long, 17-jointed, articles long, basal subcrassate, the first four or five not hirsute.

Prosternal teeth 3+3, large, inner coalesced; a transverse sulcus along anterior part of sternum.

The first four dorsal plates immarginate; posterior borders transversely wrinkled; crest of anal segment weak, only extending three-fourths of the way.

Sulci of ventral plates distinct; last plate rather short, narrow, posterior border rounded.

Second tarsal joint of all the legs, except anal pair, armed. Anal legs rather long and stout; 10–13 spines on the superior-interior surface of femora arranged in 3 series; within are 2 or 3 uniseriate spines; beneath 7–9 spines arranged in 2 or 3 series; apical process with 6–8 spines.

Femora of 2–20 pairs of legs, armed with 4 or 5 spines at their exterior apex, the posterior usually with 5 spines; femora of penultimate pair of legs armed above with 1–3 spines.

Posterior pleuræ with 9–12 apical spines and 1 or 2 marginal; above on margin of dorsal plate are 2 small spines.

Length of largest specimen 160^{mm}.

This species is described from two adult and one young specimen from Chatham Island, one young individual from James Island, and another from Albemarle Island. The type is an adult from Chatham Island.

The five species belonging to this group of *Scolopendra* may be separated as follows:

Femora of penultimate pair of legs armed; first dorsal plate with a transverse sulcus.

a. Ventral plates not sulcate; tibiæ of anal legs armed with spines ..... ***Prasina.***

aa. Ventral plates with two longitudinal sulci.

b. Last dorsal plate without a median carina.

c. Femora of last three pairs of legs armed; tibiæ of anal legs unarmed... ***Valida.***

cc. Femora of all legs armed; tibiæ of anal legs armed..................... ***Gigas.***

bb. Last dorsal plate with a median carina.

d. Femora of penultimate pair of legs not armed above; spines at apex of femora of 2–20 pairs of legs, 2 or 3; spines of apical process of anal legs, 1–3; spines of apex of anal pleuræ, 1–3 .... ***Viridicornis.***

dd. Femora of penultimate pairs of legs with 1–3 spines above; spines of apex of femora of 2–20 pairs of legs, 4 or 5; spines of apical process of femora of anal legs, 6–8; spines of apex of anal pleuræ, 9–12........... ***Galapagoensis.***

7. Scolopendra sp.?

No. 591, Abrolhos Islands, Brazil.

A very young specimen and unidentifiable.

8. Henicops chilensis Gervais.

1847.—*Henicops chilensis* Gervais.

Aptères, iv, 239 (Chile).

No. 593, Port Churruca, Straits of Magellan.

One young mutilated female.

Prosternal teeth, 4+4.

SCIENTIFIC RESULTS OF EXPLORATIONS BY THE U. S, FISH COMMISSION STEAMER ALBATROSS.

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No. VI.—LIST OF THE PLANTS COLLECTED IN ALASKA IN 1888.

BY

DR. GEORGE VASEY.

Ranunculaceæ.

Aconitum Kamtschaticum, Willd. Ounalaska, Kodiak, and Humboldt Harbor.
Anemone narcissiflora, Linn. Humboldt Harbor.
Ranunculus occidentalis, Nutt. Ounalaska.

Geraniaceæ.

Geranium erianthum, D. C. Eagle Harbor, Ounalaska, Humboldt Harbor, Kodiak.

Leguminosæ.

Lathyrus palustris, Linn. Humboldt Harbor, Kodiak.
Lupinus Nootkatensis, Donn. Ounalaska, Kodiak.

Rosaceæ.

Fragaria Chilensis, Duchesne. Kodiak.
Geum calthifolium, Smith. Humboldt Harbor.
Potentilla palustris, Scop. Kodiak.
Rubus chamæmorus, Linn. Humboldt Harbor.

Saxifragaceæ.

Heuchera glabra, Willd. Humboldt Harbor.
Parnassia palustris, Linn. Humboldt Harbor, Kodiak.
Saxifraga Hirculus, Linn. Humboldt Harbor.

Crassulaceæ.

Sedum Rhodiola, D. C. Eagle Harbor.

Onagraceæ.

Epilobium spicatum, Law. Eagle Harbor, Humboldt Harbor, Kodiak.
Epilobium affine, Bongard. Humboldt Harbor.

Umbelliferæ.

Ligusticum Scoticum, Linn. Ounalaska.
Selinum Hookeri, Watson. Ounalaska, Kodiak.

Cornaceæ.

Cornus Canadensis, Linn. Ounalaska.

Araliaceæ.

Fatsia horrida, B. & H. Kodiak.

Caprifoliaceæ.

Sambucus racemosus, Linn. Kodiak.

Valerianaceæ.

Valeriana capitata, Pall. Humboldt Harbor.

Compositæ.

Achillea millefolium, Linn. Kodiak, Eagle Harbor, Ounalaska, Humboldt Harbor.
Aster Sibiricus, Linn. Kodiak.
Erigeron salsuginosus, Gr. Ounalaska.
Prenanthes alata, Gr. Kodiak.
Senecio pseudo-arnica, Less. Ounalaska.
Senecio resedifolius, Less. Humboldt Harbor.
Solidago lepida, D. C. Kodiak, Humboldt Harbor, Ounalaska.

Campanulaceæ.

Campanula Scheuchzeri, Vill. Humboldt Harbor, Kodiak.
Campanula lasiocarpa, Cham. Ounalaska.

Ericaceæ.

Bryanthus taxifolius, Gr. Middleton Island.
Pyrola rotundifolia, Linn. Humboldt Harbor.
Rhododendron Kamtschaticum, Pall. Ounalaska, Humboldt Harbor.

Gentianaceæ.

Swertia perennis, Linn. Ounalaska.

Scrophulariaceæ.

Castilleia pallida, Kunth. Humboldt Harbor, Ounalaska.
Mimulus luteus, Linn. Ounalaska, Humboldt Harbor, Kodiak.
Pedicularis Chamissonis, Stev. Ounalaska.
Pedicularis verticillata, Linn. Humboldt Harbor.

Polygonaceæ.

Polygonum viviparum, Linn. Ounalaska, B. C.
Rumex occidentalis, Watson. Middleton Island.

Salicaceæ.

Salix reticulata, Linn. Ounalaska.

Orchidaceæ.

Cypripedium guttatum, Swartz. Ounalaska.
Habenaria dilatata, Gr. Humboldt Harbor.

Iridaceæ.

Iris Sibiricus, Linn. Ounalaska, Humboldt Harbor, Kodiak.

Liliaceæ.

Fritillaria Kamtschatcensis, Ker. Humboldt Harbor.
Streptopus amplexifolius, D. C. Humboldt Harbor.

Cyperaceæ.

Eriophorum vaginatum, Linn. Kodiak.
Eriophorum polystachyon, Linn. Humboldt Harbor.
Eriophorum augustifolium, Linn. Ounalaska.
Eriophorum russeolum, Fries. Ounalaska.
Carex limosa, Linn., var. stygia, Bailey.

Gramineæ.

Calamagrostis (Deyeuxia) Aleutica, Trin. Middleton Island.
Calamagrostis (Deyeuxia) Langsdorfii, Trin. Middleton Island.
Deschampsia cæspitosa, Beauv. Middleton Island.

Filices.

Adiantum pedatum, Linn. Ounalaska.
Aspidium acrostichoides, Swz. Ounalaska.
Asplenium felix-fœmina, Bernh. Ounalaska, Humboldt Harbor.

Lycopodiaceæ.

Lycopodium clavatum, Linn. Ounalaska.

WASHINGTON, D. C., *March* 27, 1889.

SCIENTIFIC RESULTS OF EXPLORATIONS BY THE U. S. FISH COMMISSION STEAMER ALBATROSS.

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No. VII.—PRELIMINARY REPORT ON THE COLLECTION OF MOLLUSCA AND BRACHIOPODA OBTAINED IN 1887-'88.

BY

WILLIAM HEALEY DALL, A. M.,
Curator of the Department of Mollusks.

(With Plates V to XIV.)

Before proceeding to discuss the particular specimens obtained on the voyage of the U. S. Fish Commission steamer *Albatross* from Fortress Monroe in Chesapeake Bay to Magellan Straits and northward to California, it may not be improper to say a few words on the conditions under which the deep-sea Mollusks exist, and the reasons why a study of these animals is important for science.

In order that their existence may be maintained, the abyssal mollusks require oxygen to aerate their circulation, food to eat, and a foot-hold upon which they may establish themselves. It is necessary that the conditions should be such as will not prevent the development of the eggs by which successive generations are propagated. That they do permit it may be assumed from the very fact that mollusks in large numbers have been shown beyond all question to exist on the oceanic floor wherever it has been explored.

Formerly, when dredging with the usual appliances in small boats, 100 fathoms (600 feet) was considered extremely deep. If one stands at the foot of the great Washington obelisk and looks up, the idea of collecting a satisfactory representation of the insects and plants on the ground at its base by dragging a 6-foot trawl or dredge by a line let down from the apex of the monument strikes one as preposterous. Yet the monument is less than 100 fathoms high. Multiply this height ten or fifteen times and the idea seems, if possible, still more unreasonable; yet it is a fact that successful dredging has been done from a height above the sea bottom of not less than twenty-five times the height of the Washington Monument. Living animals have been secured from a depth equalling the distance from the Capitol to Rock Creek, or from the Washington Monument to the Mansion at Arlington—that is to say, about 2½ miles.

It is therefore evident that in speaking of dredging we must revise our terms and define them so as to conform more nearly to the new conditions under which such work is done.

The waters immediately adjacent to the shores were long ago divided by Forbes and other pioneers in marine exploration into zones or areas, according to the conditions characterizing them; as, for instance, the Laminarian zone or region of brown kelp, the Coralline zone or region of stony algæ, etc. But for general purposes and to contrast the areas of the whole sea one with another, according to their chief characteristics, we may now divide the entire sea bottom into three regions.

The first is that to which light can penetrate, and therefore where marine vegetation can exist. This is the Litoral Region, and in a general way, modified by special conditions at particular places, it may be regarded as extending from the actual shore out to the limit of 100 fathoms. Beyond this it is practically certain that the light reaching the bottom is insufficient for the growth of sea-weeds. Outside of this the borders of the continents slope gradually to the bottom of the ocean, which is found usually at a depth of about 2,500 fathoms.

On the upper parts of these continental slopes the conditions are often very favorable for marine life. Currents of comparatively warm water, like the Gulf Stream, sweep along, bringing fresh pure water and supplies of food to the animals along their track. The division between the abysses and the slopes is rather a matter of temperature than of mere depth, but the temperature itself is somewhat dependent on the depth. The influence of the great warm currents rarely extends below 700 or 800 fathoms, and this depth corresponds roughly to a temperature of about 40° Fahr. Below this it diminishes as the depth increases at the rate of about one-tenth of a degree to 100 fathoms, until the freezing point is reached, though there is no reason to suppose that the abyssal water ever actually becomes congealed.

To this cold, dark area of the ocean bottom has been applied the name of the Benthal or Abyssal Region.

To the region chiefly on the continental slopes, between the Litoral and Abyssal regions, I gave, some years ago, the name of the Archibenthal Region.

These divisions have been recognized by various writers and have had several terms applied to them. Those I have mentioned seem to me as characteristic as any, and, in some respects, more convenient than any I have heard used.

Let us now consider the conditions under which life exists in the Abyssal and Archibenthal regions. It may be premised that the differences between them are largely of degree and not of kind and do not require that the two regions should be considered separately.

The chief characteristics reside in the composition of the sea water, including its contained gases; in the dynamic status of the deeps, especially in relation to temperature and pressure; in the mechanical qualities of the materials of which the oceanic floor is composed; and, lastly, in the food supply.

As determined by physicists and chemists, the water of the deep sea varies in the proportions of mineral salts, carbonic acid, and air contained in it very much as does the surface water. In general, at the surface the warmer water of the tropics has the more salt and the less nitrogen. When carried by currents to the Polar regions and cooled this tropical water sinks to the bottom carrying its excess of salt along with it. The Polar waters are less saline and contain more nitrogen. The proportion of atmospheric air in the water is found strictly related to the temperature, the pressure at great depths being regarded as having no bearing on the question. The amount of oxygen in the sea water diminishes gradually as we descend from the surface until about 350 fathoms is reached, when it ceases to change, or, at most, increases slightly until the bottom is attained.

Carbonic acid, according to Tornoë, does not exist in a free state in sea water, but only in the form of carbonates, or, to a less degree, of bicarbonates. Unless the decomposition of animal matter in some manner sets free the carbonic acid, this conclusion is one which can not be adopted without question, especially when we consider the great difficulties which are encountered in any attempt to obtain, or when obtained to analyze, abyssal water. The effect of erosion on the shells dredged from the deeps, even when they contain the living animal, is so strongly marked, the devices for protection against erosion are so recognizable in various species, that the biologist may well call the physicist to a halt, while the latter re-examines his data. It is certain that erosive agencies, of which the effects are indistinguishable from those known to be due to carbonic acid in other instances, are extremely active in the deeps.

In general, it seems as if we might safely assume that the composition of abyssal sea water shows no very important differences from that of other sea water, and that the animals existing in it are not exposed to any peculiar influences arising from this source alone.

This can not be said of the physical conditions. Every one knows how oppressive to the bather is the weight of the sea water at only a few feet below the surface, and how difficult it is to dive, still more to remain on the bottom, if only for a few seconds.

But it is difficult to convey any adequate idea of the pressure at such a depth as 2,000 fathoms, or about 2 miles below the surface. Rope made impervious by tarring is said to have become reduced one-third in its diameter by a descent into these depths. Any hollow object not pervious or elastic is at once crushed. There is no doubt that at some points on the ocean floor the pressure may amount to several tons to the square inch. If we recall that the average pressure in steam boilers is probably much less than 100 pounds to the square inch, it may help towards an appreciation of the abyssal conditions.

The inevitable conclusion is, therefore, that all the animals living under these conditions must have their tissues so constituted as to permit the free permeation of the water through every part in order that the pressure may be equalized. How this is possible without putting an end to all organic functions is, perhaps, the greatest mystery of abyssal life. How can a large egg, like those of various deep-sea animals, pass through the stages of segmentation and development, with every molecule of its structure in actual contact with ordinary sea water and every solid particle subjected to a pressure of, say, a thousand pounds to the square inch? Such questions are much easier to ask than to answer; in fact, no attempt at an answer has, so far as I am aware, ever been offered to biologists.

The looseness of tissue necessary to such a permeation is conspicuous in abyssal animals, whose flabby and gelatinous appearance when they reach the surface is notorious. It is, perhaps, most noticeable in the fishes, which, nevertheless, are often armed with formidable teeth; but, under the great pressures of the deeps, it is quite conceivable that each of these loose and half-dissolving muscles may be compressed and reduced to a condition resembling steel wire, and that the organization thus sustained may be as lithe and sinewy in its native haunts as its shallow-water relatives are in theirs.

It is well known how great an influence on the distribution of shallow-water species is exerted by the temperature of the water in which they live. No doubt the differences of temperature affect the nervous system, the rate of muscular contraction and the motions of the cilia, by which in mollusks many of the functions of life are aided or wholly carried on.

But it is probable that the influence of temperature is far more effectively exerted upon the development of the ova, and hence upon the propagation of the species, than directly upon the parents. It is probable that most adult mollusks could endure a very wide range of temperature if the individuals were subjected to the changes by extremely slow degrees; but it has been shown that a difference of one or two degrees below a certain point on the thermometric scale will destroy the embryos of *Ostrea* or prevent their development, so that they perish. In this way the spread of the species may be effectually checked, though the adult shell-fish may flourish without difficulty in the same region.

In the shallower parts of the Archibenthal Region a few great currents like the Gulf Stream may reach, for a small part of their course, the ocean floor, and sweep it clean of sediment and detritus if not entirely of living beings. Such mechanical effect as is produced must be of a rather steady and uniform nature for considerable periods and in no respect resemble the crushing and grinding which take place on every exposed beach on which the sea rolls up. In fact, regarded as individuals, the mollusks in the path of the Gulf Stream and other great currents have little or nothing to fear from the mechanical attrition which plays so large a part in the shallows. On the other hand, wherever the force of the stream is not sufficient to sweep the bottom clean, the supplies of oxygen and food brought by it to the colonies along its path so far exceed the normal for quiet waters that the animals thus favored flourish and multiply in a manner never seen in quiet deeps.

The influence of darkness upon the inhabitants of the Abyssal Region has often been expatiated upon. The absence of visual organs, or their preternaturally excessive development beyond the normal of the groups to which the individuals belong, is evidence enough that the deeps are markedly darker than the shallows. But this evidence proves too much for the claim that the deeps are mathematically dark. Whatever notions may be entertained or conclusions deduced by the physicist from the premises, the presence of large and remarkably developed eyes in many abyssal animals shows that light of some sort exists even on the oceanic floor. It is inconceivable that these organs should be developed without any light, and if the experiments and reasoning of the physicist result in the apparent demonstration of absolute darkness in the depths, the facts of nature show that in his premises or his experiments there lurks some vitiating error. It seems absurd to suppose that the phosphorescence of certain animals or parts of animals in the deep-sea fauna is a factor of sufficient importance to bring about the development of enormous and exquisitely constructed eyes in a multitude of deep-sea species. A greater or general phosphorescence, such as would amount to a general illumination, has never been claimed by any scientific biologist, and, as a theory, requires a mass of proof which seems unlikely to be forthcoming.

In general, then, we find the physical conditions simpler than those of the shallows and yet much more energetic. The effect of temperature is marked in the distribution of life over cold and warmer areas of sea bottom. The relative importance of the effects of pressure, partial darkness, and of the quietness of abyssal waters, our knowledge is yet too imperfect to allow us to precisely estimate. All, doubtless, have their effect; some of the effects are more obvious than others, but it is by no means certain that the most obvious are necessarily the most important to the organisms concerned.

The mechanical character of the sea bottom is of greater importance than is generally realized. In a very small proportion of its extent the sea bottom is composed of bare, or nearly bare, rock. Away from the shores such a bottom is usually situated in the trough of some great current like the Gulf Stream, and then seems to be nearly bare of animal life. In other cases it may be found on the walls of submarine cliffs, which, for obvious reasons, can hardly be explored for marine life with our present appliances.

The rest of the bottom consists of solid matter in different stages of subdivision, from something which may be described as calcareous gravel to an impalpable mud which may or may not be dotted with concretions of manganese, iron, or other mineral matter. The gravels are chiefly confined to the Archibenthal Region; the true deeps are generally carpeted with a viscid layer of the finest possible calcareous mud or clay. The latter formation is meager in its fauna as clay is when it occurs in shallow water.

Certain forms of mollusk life flourish in a soft bottom, especially the *Nuculidæ* and their allies, which are notably abundant in the depths as well as in the muddy shallows of the Litoral Region. Others require some solid substance upon which to perch, a stone, a bit of wood, a spine from some dead echinoderm, something they must have for themselves and for their eggs which shall raise them above the muddy floor. In regions where such objects are rare or absent on the sea bottom such mollusks are equally rare or wanting. Most ingenious are the shifts made in many cases, as when we find *Lepetella* safely housed in the tubes of dead annelids or Hydroids, and *Choristes* taking refuge in the empty ovicapsules of rays or sharks. Small hermit crabs take to the tooth shells (*Dentalium*) or to the tubular Pteropods (*Cuvierina*), or *Amalthea* roosts on an *Echinus* spine and builds for itself a platform as it grows, recalling the arboreal houses of some Oriental savages.

In the Archibenthal Region there is a more or less constant drift of débris from the adjacent shallows which gradually forms banks of considerable magnitude. The action of erosion and solution for some reason seems less potent here than in either the shallower or the deeper parts of the sea. In the shallower parts the excess of motion, in the deeps the excess of the eroding agent, may account for this. The fact is known to me from the study of many specimens from both regions and is beyond question.

A feature in forming certain of these banks, to which attention has hitherto not been directed, is worthy of mention. This is the habit of certain fishes, which exist in vast numbers, of frequenting certain areas where they eject the broken shells of mollusks, corals, barnacles, and other creatures which they have cracked, swallowed, and cleansed of their soft tissues by digestion We have learned from Darwin of the marvelous work of the earth-worm in Britain. The ejectamenta of a single fish of moderate size in one day would far exceed the accumulations of many earth-worms for a much longer time. Now, in examining critically large quantities dredged from the bottom, I have found the material from certain areas almost entirely composed of these ejectamenta. In the interstices some small creatures hide, but the tooth marks of the fish were upon nearly every fragment. As, for a pint of fragments of a given species, this bottom stuff would rarely contain half a dozen specimens which had been taken alive by the dredge (most frequently the species did not occur at all living in the material so dredged), it was obviously impossible that the shells could have been captured and afterward voided on the same spot. It seemed more likely from all the facts that these fishes, after feeding to repletion, repair in large schools to certain areas to enjoy the pleasures of digestion. There would be nothing improbable in the fish of a limited region preferring some special locality for this purpose, and the result might be the accumulation of a veritable bank, of which nearly the whole had at some time or other passed through the intestine of a fish. At all events, whatever explanation be offered of them, it is certain that such accumulations do occur at certain localities, as shown by the dredgings of the Fish Commission off the eastern coast of the United States.

The last condition remaining to be considered is that of the food supply. It has long since been pointed out that marine vegetation ceases to exist within a limit of 600 feet below the surface. Whatever light exists in the depths it is not of a nature to meet the needs of vegetation. Whether any other factor joins with the absence of light to discourage algal growth is yet unknown, but not intrinsically improbable. The mollusks which belong to groups known as phytophagous in shallow water, in the deeps appear to live chiefly on foraminifera which they swallow in immense quantities. The results of this diet are evident in the greatly increased caliber of the intestine relative to the size of the animal, in the diminution of the masticatory organs, teeth, and jaws, and in the prolongation of the termination of the intestine as a free tube to a length which will carry the fæces out of the nuchal commissure, and thus free from their injurious effects the branchial organs, which are usually seated in this space. The quantity of nutriment in the protoplasm of foraminifera is so small that a much larger mass in proportion of these organisms must be swallowed, and their remains consequently ejected afterward, than if the food consisted of the tissues of algæ.

But the great mass of abyssal mollusks are members of those groups which in shallow waters are normally carnivorous, and to a great extent prey upon one another. In the deeps, however, this reciprocal destruction is unnecessary.

Those who have become familiar with surface collecting on the sea, alone can realize the immense quantity of organisms which exist in the water on or near the surface. These are frequently numerous enough to reduce the water to the consistency of soup for miles in extent and to a considerable depth. Millions of these creatures are constantly sinking from the region where they naturally belong, either from injury or exhaustion, and thus raining slowly but constantly upon the bottom. This fact is not new and is admitted to be unquestionable by all biologists. Hence in many regions of the sea bottom the resident fauna have, as it were, only to lie still and hold their mouths open.

One of the facts which attracted my attention when I first began to study deep-sea mollusks was the singularly small number which showed signs of having been drilled or attacked by other mollusks. Apart from those showing the marks of fish teeth, or the dental machinery of echinoderms, it is extremely rare to find drilled bivalves or univalves such as make up the great mass of the jetsam on every sandy beach. Such cases occur, but the occurrence is always exceptional and the holes which are most often found in abyssal shells are those which are due either to the friction of some hermit crab or to the erosive properties of the secretions of certain annelids which fix their irregular tubes upon the outer surface of the shell. These injuries can not easily be confounded with the circular drill-holes of carnivorous gastropods. Having handled more deep-sea mollusks than any other naturalist now living, and spent, probably, more time over material procured by the dredge from shallow water than any one else of my acquaintance, I do not feel that I am presumptuous in affirming the remarkable difference which obtains in this respect between the dead material from the Litoral and from the Extra-Litoral Regions, respectively.

This brings me to a conclusion which I have elsewhere published with less detail. The animals belonging to the mollusca which are found in the Archibenthal and Abyssal regions, especially the latter, do not live in a perpetual state of conflict with one another. A certain amount of contention and destruction doubtless goes on, but on the whole the struggle for existence is against the peculiarities of the environment and not between the individual mollusks of the area concerned. It is an industrial community, feeding, propagating, and dying in the persons of its members, and not a scene of carnage where the strong preys upon his molluscan brother who may chance to be weaker. Depredations on this community are doubtless committed by deep-sea fishes and echini, perhaps by other organisms, but the inroads are not so important as to seriously modify the course of evolution and influence specific characteristics.

Hence the course of evolution and modification, though still complex, is certainly much less so than in the shallower parts of the ocean. For this reason we may hope to penetrate more deeply into its mysteries with deep-sea animals than with those less fortunately situated. In this opportunity, it seems to me, lies the chief importance of research into the biology of deep-sea mollusks. Nowhere else may we hope to find the action and reaction of the contending forces less obscure, and modification in most cases has not extended so far that we can not compare the deep-sea forms with their shallow-water analogues and draw valuable conclusions.

While we are not yet in a position to formulate conclusions covering all the details of abyssal mollusk-life, in certain instances results suggest themselves.

Deep-sea mollusks, of course, did not originate in the deeps. They are the descendants of those venturesome or unfortunate individuals who, by circumstances carried beyond their usual depth, managed to adapt themselves to their new surroundings, survive, and propagate, Many species must have been eliminated to begin with. Others more plastic, or more numerous in individuals, survived the shock and have gradually spread over great areas of the oceanic floor. In accordance with these not unreasonable assumptions we should expect to find, at least among the newer comers, some characters which were assumed under the stress of the struggle for existence in the shallows, and which, through specific inertia, have not become wholly obsolete in the new environment. We should also expect to find a certain proportion of archibenthal species in any given area, identical with or closely related to the analogous Litoral Region forms of the adjacent shores.

In the Abyssal Region alone should we expect to find that any considerable proportion of the fauna has lost all its litoral characteristics, assumed characters in keeping with its environment, and become disseminated over the ocean bottom throughout a large part of its extent. These expectations in the main are fairly satisfied by the facts as far as the latter are positively ascertained.

With the lesser need of protection from enemies and competitors would necessarily be related a less vigorous elimination of characters which in struggle and competition might prove sources of weakness. The limits of uninjurious variation would be relaxed at the same time and to the same extent. We find, as we should expect, that the deep-sea mollusks are more variable in their ornamentation and other superficial characters than those from shallow water. In some species the balance of characters is fairly well maintained, in others variation runs riot, and it is impossible to say what amount of it should constitute a basis for specific subdivisions among individuals.

In general, deep-sea shells present pale or delicately tinted color-patterns, are white or owe their color to the tinting of the epidermis. This may be due directly to the absence of light. Sunlight, when present, seems to have a stimulating effect in developing colors as is shown by the greater brightness of tropical litoral shells whatever their colors. It operates indirectly by promoting the development of color in algæ which are fed upon by phytophagous mollusks and affect the coloration of the latter directly through the assimilation of the coloring matter of the food, mechanically. Indirectly, through the influence of protective mimicry, the coloration of shells which frequent beds of seaweed or rocks covered with stony algæ is often modified in harmony with the environment even when the species is not phytophagous. In the deeps these influences are wanting, and the development of color is necessarily the result either of uneradicated hereditary tendency, or of some physical features of the environment which operate mechanically and are not yet understood.

The colors chiefly affected by deep-sea mollusks are pink or reddish, straw-color, and various shades of brown. These are found in the shell and are more or less permanent. The epidermis of deep-sea shells is usually pale yellowish, but frequently is of a delicate apple-green such as is seen in many fresh-water species; and sometimes of a beautiful rich dark chestnut-brown, a color also not rare among land and fresh-water species. The most common pattern when any exists is that formed by squarish dark spots, which occasionally become fused into bands. Among the archibenthal species found in depths from 100 to 300 fathoms this pattern of brown squarish spots arranged in spiral series is notable in such forms as *Scaphella junonia*, *Aurinia dubia*, *Halia priamus*, *Conus mazei*, etc. Instances of the green epidermis are afforded by the various species of *Nuculidæ*, *Turcicula*, and *Buccinidæ*.

The thick and solid layers of aragonite, of which many shallow-water species are chiefly built up, are represented in deep-water forms by much thinner layers, while the nacreous layers are, if not more solid in abyssal shells, at least more brilliant and conspicuous, perhaps because less masked by aragonitic deposits. A very large proportion of the deep-water shells are pearly and derive their beauty from the brilliance of their nacre.

In the matter of sculpture the mechanical effect of the pressure operates against the development of weight and thickness in benthal shells since the whole must be permeable. It is probable, too, that the soft and sticky character of the abyssal ooze would put the possessor of an unusually heavy shell at a considerable disadvantage in getting about on the bottom. Any impermeable shelly structure on the ocean floor would have to be strong enough to sustain without crushing a weight hardly less than that borne by the rail under the driving-wheel of an ordinary locomotive. It is sufficiently obvious from a mere statement of the case that none of them can be impermeable.

The heavy knobs or arborescent varices of shallow-water Murices are represented in their deep-water congeners by extremely thin and delicate spines and slender processes. These are probably all reminiscences of shallow-water ancestors, as it is difficult to imagine any cause which in the abysses would lead to a development of such defenses *de novo.*

The sculpture most usual on deep-water shells is of a kind which serves to strengthen the structure, much like the ridges which give rigidity to corrugated-iron work, or the curves used by architects in wrought-iron beams. Spiral or longitudinal hollow riblets, a transverse lattice work of elevated laminæ such as are developed for similar reasons on the frail larval shells of many gastropods, a recurvature of the margin of the aperture in forms which in the Litoral Region never develop such recurvature—these are instances in point.

Besides these there are small props and buttresses developed which serve the same purpose of strengthening the frail structure at its points of least resistance. Such are the garlands of little knobs so commonly found in front of the suture in abyssal shells of many and diverse groups.

It is not intended to suggest that the methods above indicated have not been developed also in shallow-water forms and for similar reasons. The distinction which I would point out is that in litoral species, as a rule, these devices are subsidiary to the much simpler course of strengthening the shell by adding to its thickness. In the abyssal forms, for reasons already explained, this mode is not practicable and consequently we have the one without the other. The operculum is generally horny in abyssal mollusks, frequently disproportionately small, compared with that of congeneric litoral species, and in a remarkably large number of cases is absent altogether.

As might be expected of descendants with modification, the resemblance is greater between the larval shells of benthal species and those of their shallow-water relatives than between the parts of the shell of later growth. There is one notable difference, however. In the deep-water forms the nucleus is frequently larger than in their litoral analogues. It would seem as if the condition of the depths were such that of a small number of large larvæ more are more likely to survive than of a large number of small ones; or at least that this form of reproduction is more useful to the species. These details will serve to show the multiplicity of facts to be accounted for and the opportunity for advancing science by a study of abyssal conditions and their effects upon the animals subjected to them. Without claiming any unique importance for the theories advanced in the foregoing remarks it may still be said that the subject is one of the very greatest interest. Perhaps experiments upon shallow-water forms, artificially subjected to pressure, may at some future time enable us to penetrate more deeply into the mysteries of life in the abysses.

It now remains to take up the collections made by the *Albatross* party on their voyage.

Beginning the enumeration at Santa Lucia in the West Indies, and terminating it at San Francisco, California, it appears that the register of operations includes one hundred and forty dredging stations and forty anchorages, besides sundry surface collections. From the inspection of the collection of mollusks, which is almost entirely preserved in alcohol, it seems that mollusks were collected in eighty of the casts of the dredge or trawl, and at twenty-seven of the anchorages, distributed as follows:

On the Atlantic coast of America and in the Straits of Magellan, sixteen stations and eleven anchorages are represented, of which eight casts were in water over 100 fathoms deep.

On the Pacific coast of South America from the Straits of Magellan to Panama and to the Galapagos Islands mollusks were collected at thirty-nine stations and twelve anchorages. At eleven American stations and three near the Galapagos Islands the depth was over 100 fathoms.

On the Mexican and Central American coast north of Panama mollusks were obtained at twenty stations and six anchorages, none of which were in more than 100 fathoms.

Lastly, on the coast of California at five stations, of which two were in more than 100 fathoms, and at three anchorages, mollusks were collected.

Altogether the dredgings on archibenthal grounds amounted to twenty-four, all told. The mollusk collection made at these stations was very small in bulk, though important in its nature.

The collections can be roughly divided into two classes. The first, from the Litoral Region, is of value as indicating the distribution of the species, and as affording rare specimens with the soft parts in condition for study. The full value of this part of the collection will not be evident until the whole has been thoroughly studied, compared, and named, which will necessarily be a work of considerable duration.

The second portion of the collection is that containing the deep-water species whose interest is of a wider sort, for reasons already discussed. Being so much smaller in bulk it can be readily handled and discussed, especially in connection with previous work done in the region between Chesapeake Bay and the northern shores of South America.

I shall therefore in this report, which is avowedly of a wholly preliminary nature, confine my attention chiefly to the deep-sea forms of both oceans and the Atlantic shallow-water species; combining with those collected on the voyage from ocean to ocean a few, obtained by the *Albatross* in previous work on our southeastern coast, which naturally fall into the same category, and including with the merely descriptive matter a discussion of some points in regard to the anatomy and biography of these species. A supplementary report on the shallow-water forms of the Pacific collected on the voyage is in preparation by Dr. R. E. C. Stearns.

In a general way, before dismissing the shallow-water collections from consideration, I may point out that the collections from the eastern shores of the two Americas are of great value as extending our knowledge of the geographical distribution of many species. Thus we find that a good many of the forms common to the shores of Florida and the Gulf of Mexico, as well as the Antilles, extend to the Abrolhos Islands or even to Rio Janeiro, while, mixed with them, are a few which seem to find their normal geographical center near the southern extremity of South America. On the west coast of South America the shore collections offer nothing unexpected and the collections from the shores of the Galapagos Islands are unfortunately meager. Those from moderate depths of water off the coast of Lower California, on the other hand, show glimpses of a fauna apparently as rich as that of the Antilles and which has so far been little investigated.

The archibenthal fauna off the coast of Alta California, like that off the shoals of Nantucket and Martha's Vineyard in New England, shows an almost entirely distinct facies from that of the shallower water near the shores, and in the future will doubtless afford a rich harvest of novelties to the naturalists who investigate its treasures. The present contribution to that branch of the subject is a mere beginning in a line which promises rich results when more effectively explored.

In conclusion I would express my appreciation of the facilities offered by the authorities of the Fish Commission, the National Museum, and the Smithsonian Institution in the preparation of this report.

NOTES ON THE SPECIES COLLECTED.

Class BRACHIOPODA.

The collection of *Brachiopoda* made on the voyage was small and of little interest. Only one species, represented by two specimens, was an addition to the Museum collection. The localities and data have a certain value for students of the group.

Family EUDESIIDÆ.

Eudesia venosa Solander.

This species was obtained from latitude 45° south, off the east coast of South America, near Point Malaspina southward to Magellan Straits, in 20 to 80 fathoms, the temperature varying from 47° to 57° F. The station numbers were 2769, 2770, 2772, 2775, 2777, 2778, and 2779.

Eudesia fontaineana Orbigny.

Terebratula fontaineana Orb. Voy. Am. Mer., v., p. 675, No. 782, ix, pl. 85, figs. 30, 31.
Waldheimia venosa (pars) Dall, Proc. Acad. Nat. Sci., Phil., p. 183, 1873, not of Solander.

HAB.—Station 2783, off the west coast of Patagonia, in south latitude 51° 2′, in 122 fathoms mud; bottom temperature 47°.9 F.

This interesting species appears to be very rare; the only other specimens I have heard of are the original types of Orbigny, in the Paris Museum, which I have never seen. His figure is excellent, but rather too inflated, which led me in 1873 to refer the species, though with some doubt, to *E. venosa* as a synonym. An examination of the present specimens leaves no doubt of the validity of the species. Externally it much resembles a large, smooth specimen of *Terebratulina caputserpentis* var. *septentrionalis*. The ramifications of the sinuses are white and form two blunt rather short channels on each side of each valve. They have no small attenuated divarications as in *E. venosa*. The exterior is mostly of a russet-brown color, but this may possibly be extraneous. The soft parts and apophyses do not differ from the usual type in this genus.

Terebratella dorsata Gmelin.

This species was, on the east coast of South America, not obtained north of south latitude 52°, near Cape Virgins, but elsewhere was associated with *E. venosa* and obtained through the same range of depth and temperature at Stations 2772, 2775, 2777, 2778, 2779 and at various points in Magellan Straits.

Bouchardia rosea Mawe.

Special search for this species was enjoined in the instructions to the collectors of the expedition, as the soft parts are not yet known and the shell is very peculiar. The only results were the dredging of a number of valves and dead shells at Station 2762, in south latitude 23° 08′ and west longitude 41° 34′, east of Rio Janeiro in 59 fathoms mud and gravel; bottom temperature 57°.1 F.

Family TEREBRATULIDÆ.

Terebratulina cailleti Crosse.

This well known Antillean species was obtained at Station 2750, off St. Bartholomew, West Indies, in 496 fathoms sand, and at Stations 2752 and 2753 in 281 fathoms sand off Santa Lucia, the bottom temperatures ranging from 44°.4 to 48° F.

Family LINGULIDÆ.

Glottidia albida Hinds.

This species was dredged in 5 fathoms mud, off the coast of Lower California, in north latitude 26° 42′.

Family CRANIIDÆ.

Crania pourtalesii Dall.

HAB.—Station 2,781 in south latitude 51° 52′ west, longitude 73° 41′ on the west coast of Patagonia in 348 fathoms mud; bottom temperature 50° F.

This species had previously been obtained only from the Florida reefs and in the Antillean region in deep water. The discovery of it at the present locality not only carries it southward to the Straits of Magellan but to the western coast of South America, where this genus has not hitherto been known, either as recent or fossil.

Class PELECYPODA.

GENERAL CONSIDERATIONS.

The attempt to divide the class *Pelecypoda* or *Lamellibranchiata* into orders has so far been unsuccessful, or, at least, the subdivisions adopted have from time to time been found unsatisfactory on account of the discovery of forms which combine in their organization characters which had previously been regarded as diagnostic of important subdivisions, such as orders.

This has resulted from the selection of characters as diagnostic which are not really fundamental in the evolutionary history of the minor groups. As we gradually become acquainted with the mutability of the adductor muscles, the gills, the arrangements for retracting the siphons and other factors in the mechanics of these organisms, the classification based upon their mutations has gradually ceased to satisfy students, though one phase or another of it may still retain a place in ordinary text-books.

To cite a few examples: It will be remembered that the most persistent of the early systems for classifying these animals was based on the number of adductor muscles or the scars upon the shell by which they might be traced. At first the groups of Monomyarians, or forms with one adductor like the oyster, and Dimyarians with two adductors, like the ordinary edible clam, seemed sufficiently well distinguished. Later when transitional forms like the mussel and its allies were carefully studied, a new group, *Heteromyaria*, was erected for those which would not fit into either of the others.

But when it is considered that there are forms like *Dimya*, in which with a monomyarian organization two distinct adductors are found, one at each end of the shell; that in *Chlamydoconcha* we have a specially modified animal with no adductors at all; that in *Mulleria* we have the young (not larval) animal typically dimyarian yet becoming in its adult stage as typically monomyarian in its muscular apparatus as an oyster; then it is sufficiently evident that better and more fundamental diagnostic characters should be found or the so-called orders given up.

Again, an attempt has been made to use the characters of one of the most mutable parts of the whole organism, namely the gill, as a basis for primary divisions of the group. I have shown elsewhere, I venture to think conclusively, that this selection is ill-advised and can not successfully solve the problem.

The simplicity or sinuation of the pallial line has been regarded as a character of high importance and has been used as diagnostic of divisions of primary importance. I have recently shown that, in certain groups, long siphons may exist with a simple pallial line, as in *Cuspidaria;* that in species without long siphons, members of the same family *Poromyidæ*, and perhaps of the same genus, may show a simple or a strongly sinuated pallial line according to the modifications of certain muscular elements which certainly can not be claimed to have any high systematic importance.

The question is further complicated by the fact that certain characters which in general are indicative of very early evolutionary divergencies, may be simulated or assumed as very modern special modifications brought about in animals of diverse groups by natural selection under the influence of special circumstances. Species thus modified will very naturally be classed with those who bear the same or similar characters as the early result of very ancient ancestral divergencies, and, as a consequence, other characters hot harmonizing, the systems are thrown into confusion. These are the difficulties among which the sum total of the organic characters must be our guide in attempting to decide. Only too often we may find, as knowledge increases, that our first judgment was more or less in error.

In reflecting upon the origin of the complicated mechanical arrangements in bivalves which we call the hinge, I have come to the conclusion that here, as in the cases of the mammalian foot and tooth, elaborated so clearly by Cope and Ryder, we have the result of influences of a mechanical nature operating upon an organ or apparatus in the process of development.

The hinge of a bivalve, reduced to its ultimate terms, consists of two more or less rigid edges of shell united by a flexible membrane or ligament.

The ligament may be wholly external or may be supplemented by an internal addendum (called the cartilage), which exerts a stress in the same direction, within certain limits. The movements of the hinge are dependent upon the elasticity of the ligament and cartilage and upon force exerted by one or more adductor muscles connecting the valves.

The rigid edges or cardinal margins of the valves may be simple or modified by the presence of interlocking processes, known as teeth, whose purpose is to regulate the direction of the valves in opening and closing.

There are three fundamental types of hinge: (1) The simple edentulous margin closing by simple apposition of the edges of the two valves; (2) the hinge in which the teeth are developed in a direction transverse to the cardinal margin; and (3) the hinge in which the direction of the teeth is parallel to the margin.

The mechanical features of the second and third types may be more or less combined in a single hinge, but the affinities of the particular form in which this may occur are usually not difficult to determine on a general survey of all its organic characters.

I am disposed to think that the time relations of the different types are those of the order in which I have cited them; the most perfect hinge, morphologically speaking, would be one which should combine the most effective features of the second and third types.

The architypal form of bivalve may be imagined as small, with nearly equilateral, symmetrical, subcircular valves with edentulous cardinal margin and a short external ligament nearly central between the umbones. This is the character of many larval bivalves at the present day, though it is probable that many of the forms now edentulous in the adult state, have passed through an evolutionary stage in which they had a more or less denticulate hinge margin, while their present condition is one in which the hinge has diminished in complexity, or, in other words, undergone degeneration.

Very few of the earliest known bivalves appear to have hinge teeth, though this may be on account of our imperfect knowledge of many of them, since they are often represented by fossils in which no evidence of the hinge structure is discernible. It is highly probable that the evolution of hinge teeth closely followed the differentiation of the Pelecypod class.

The first bivalves are all minute, as far as known, when compared with a majority of their descendants. They are usually Dimyarian, as I assume the architype to have been. It is highly probable that they possessed a developed foot and that their gills were either lamelliform on either side of an arterial stem, as in *Nucula*, *Solenomya*, and many Gastropods, or filiform, as in *Dimya* and certain Pectens. The siphons were probably little developed and the lobes of the mantle rather widely separated, or perhaps entirely free.

As long as the shell remained small and subglobular the ligament short and wholly internal, the imperfect character of the hinge was of less importance. With the essential difference between the anterior and the posterior halves of the animal, and especially with any material increase in the magnitude of the adult, more or less discrepancy would develop itself between the two ends of the shell, the subglobular form would disappear, and certain other consequences would follow. Either the ligament must increase with the size of the shell and become longer or its power would become inadequate for the proper performance of its functions.

Here I will turn aside for a moment from the direct line of argument to describe the mechanical relations of ligament and shell, a proper understanding of which is very necessary to the comprehension of the whole question.

With a wholly external ligament the operation of the valves is that of two appendages to the free ends of a C-shaped spring. The action of the muscles in pulling the valves together includes the bringing nearer to each other of the two extremities of the ligament, which the latter by its elasticity resists; consequently the operation of the ligament is in the direction of opening the valves to a certain distance. Beyond this distance the separation of the valves tends to compress the ligament, which again resists, and therefore beyond the normal distance of separation the action of the ligament tends to prevent the valves from opening. This very simple matter may be observed by any one who will examine an ordinary clam with the ligament in fresh condition and whose adductor muscles have been severed.

When the ligament, in harmony with the elongation of the cardinal margin, becomes elongated it must be either straight or angulated. For obvious reasons a ligament forming a curve or the arc of a circle is mechanically impossible. This any one can prove to their own satisfaction by putting two light wooden saucers edge to edge, convexity outward, and attaching a leather or paper ligament by cement. A curved ligament, when the valves open, will tear or break at once either itself or the edge to which it is fixed. In other words, the axis of motion of the hinge must be a straight line. If any part of the ligament diverges from the axial line it must cease to take part in the axial motion and must be capable of stretching to an extent which will neutralize its angulation, or it will be broken or torn away. But if the thickness of the ligament increases ventrally, as may be the case, when it is situated between the valves rather than as an arch above them, a certain portion may extend to and beyond the axial plane in a downward direction. The portion thus projecting will then partake of the axial motion in an opposite sense to that portion which remains above the axial line. It will be compressed when the latter is stretched by the closing of the valves and will expand as the opening of the valves allows the external portion to contract. This change may be brought about by a downward angulation of one end of the ligament (as in *Solenomya*) or as a simple downward growth, which may be central as in *Neilonella* or *Galeomma*). The former mode may be the result of an angulation of the hinge margin consequent on elongation or ventral extension. Its result is to separate a longitudinal segment of the original ligament, which may be totally detached or remain physically connected, while in either case its mechanical function has undergone a reversal of direction.

The second mode likewise removes a segment, but in a vertical direction. This segment may be physically continuous throughout its upper portion with the lower portion of the superjacent ligament. It may be wholly detached, or it may be attached by one extremity while the other is separated. In the last case its direction will be oblique, or at an acute angle with that of the original ligament. This detached segment, whatever its position, has always similar mechanical relations to the movement of the hinge, and is called a cartilage. The separation of the cartilage from the ligament is generally either central or toward the shortest end of the hinge, which is usually the anterior, owing to the fact that when the size of a lamellibranch increases, the siphons, the ovaries, the visceral mass, or the gills are the organs where proportionally increased growth is most likely to occur, and these are usually central or posterior to the umbones. In *Solenomya*, which is exceptional in having a posterior cartilage, the posterior portion is the shortest.

The amount of shifting required to put part of the ligament on the ventral side of the axis of hinge motion, or cardinal axis, is extremely small. All stages of the changes involved may be observed in the *Nuculacea*, even to one, not hitherto mentioned, where the cartilage has been developed and has subsequently become obsolete or altogether disappeared (*Malletia*), while leaving some traces of its former presence in the shape of an empty and degenerate fossette (*Pleurodon*). It is noteworthy that this suborder, which gives us so many hints as to processes which we may imagine to be of great antiquity, should, on other grounds, be regarded as among the few which best retain traces in the soft parts of archaic stages of development.

With the lengthening and angulation of the cardinal margin the ligament gradually shifted to a point where it became posterior to the beaks. Perhaps it would be better to say that the portion in front of the beaks either became segmented off as a cartilage, or became obsolete and vanished, while the portion on the posterior side gradually elongated, as the elongation of the posterior hinge-margin rendered a longer ligament more useful. It has already been pointed out that a curved ligament would involve stresses leading to its own destruction. The curvature of the cardinal margin, now the common property of a vast majority of bivalves, was inevitable with increase in size and asymmetrical development of the anterior and posterior ends of the body. Consequently, that the ligament should be shifted was a mechanical necessity unless the evolution of the group was to be confined within extremely narrow limits as regards hinge characters.

The infolding of the ligament, and the development of a cartilage and its supports, would be especially likely to occur in forms with a thin edentulous hinge, where the least shifting would be necessary (*Solenomya*, *Anatina*), rather than in those with a broad, flat hinge margin. In harmony with this proposition, we find the archaic forms, with internal cartilage, have generally a narrow edentulous cardinal border, the exceptions belonging to the more recently specialized types (*Mactra*, *Spondylus*), while the groups without an internal cartilage contain the broadest and heaviest types of hinge (*Pectunculus*, *Veneridæ*).

The infolding of a cartilage which arose by longitudinal segmentation would leave a line of weakness in the arch of the umbones. In thin shells with strong adductors there would be a tendency to fracture here. This singular feature has been perpetuated in what may be termed the normal umbonal fissure of *Solenomya*, *Periploma*, and similar forms. Traces of it are evident in *Thracia*, while the unfractured suture itself is visible in *Isocardia*, *Pachyrisma*, and *Pecchiolia*.

In the thin-shelled *Cuspidariidæ* a special buttress is often developed to support the shell at this weak point. In the *Isocardiidæ* an independent cartilage was possibly never developed, but the infolding of the anterior part of the ligament went far enough to leave permanent traces on the shell. That it did not result in a cartilage, if this was the case, may possibly be due to the fact that, owing to the great size and spiral character of the umbones, the anterior part of the ligament was turned up instead of downward, and therefore did not tend to shift toward the interior. If it is not clear how the thickening or vertical extension of the ligament below the cardinal axis should cause its separation into two parts, I need only recall the familiar experience of every one in breaking off a wire or piece of tin by bending it backward and forward on the line of the desired fracture. The mechanical principles and results in the two cases are precisely similar.

When finally developed in the same individual the ligament and cartilage work in identically the same manner but in different directions.

The resistance of the ligament to compression prevents any straining of the adductors by a too wide opening of the valves. The same resistance in the cartilage prevents the ventral margins from crushing each other by sudden and violent contractions of the adductors when the animal is alarmed and closes its valves. The nymphæ, or processes to which the ligament is attached, and the fossette or socket of the cartilage have been strengthened and regulated by the development of various buttresses and other devices, varying in different groups. The cartilage in turn has its rigidity and strength increased in many species by the special development of shell substance known as the ossiculum.

To return to the development of the cardinal margin. The asymmetry of the shell and ligament, relative to a vertical transverse plane passing through the umbones, would be promoted not only by the natural discrepancies between the anterior and posterior halves of the body, but by the mechanical effect of the projecting umbones. Where a shell opens laterally in the strict sense of the word, unless the beaks are very inconspicuous, or are separated by a wide projection of the cardinal border (as in *Arca noæ*), they will strike against and wear out one another. This abnormal or accidental result is very constantly observable in many *Anatinidæ*, such as our own *Thracia conradi*. But it must be a source of weakness and danger to the animal. If the ligament is shifted posteriorly, the valves must open more obliquely, with the result that this dangerous friction will be avoided in most cases.

In a protective armor like the valves of bivalves, other things being equal, it will be obviously beneficial, if not absolutely essential, that it should offer as few weak joints or open spaces as possible. Burrowing animals, who serve themselves of their burrow as a supplementary defense, may be able to perpetuate gaping shells and exposed siphons without serious danger from their enemies. Those animals which burrow but slightly, or live in material which enemies may also easily penetrate in their forays, will unquestionably benefit greatly by an accurate and exact closure of the valves. The intrusion of solid bodies can be to some extent guarded against by the action of the cilia or processes of the mantle margin, but such intrusion would be greatly facilitated by any organization of the hinge which would permit an independent rocking motion of the valves with respect to each other. The sudden closing which danger incites leaves no time for clearing out obstructions, and the gap is especially liable to the incursion of gravel, etc., in species which live with the plane of junction of the valves in a vertical direction. In certain brachiopods, such as *Glottidia* and *Discina*, such a semirotary motion of the valves exists, but is less dangerous to them since the plane of juncture with them appears to be generally horizontal.

To avoid these dangers and to guide the motion of the valves in closing and to prevent their sliding upon one another after closing, nature through natural selection and physical stresses has developed these cardinal processes which are known as teeth.

Attention has already been called to the fact that there can be but three fundamental types of hinge, which may be called the anodont, prionodont, and orthodont, the latter term being used to indicate the forms in which the cardinal margin has become longitudinally plicate. Actually the pure orthodont type hardly exists; in nearly all forms traces of the prionodont characters are mingled with it. For those forms, in which the archaic anodontism still persists as the characteristic of chief importance, though frequently modified by special mechanical contrivances which to a certain extent mask the type, I have proposed the term *Anomalodesmacea.* The fossette, cuilleron, or spoon-shaped process for the cartilage is a separate development, serving a special purpose. Though influencing the teeth, if any exist, in its vicinity, it must not be confounded with them. The weakness of the anodont type has left an opening for the specialization and perfection of this process, which, to a considerable extent, in this group, assumes the functions which in groups without a cartilage are the special office of the teeth.

For those forms in which transverse plication of the hinge is the chief characteristic, though rarely wholly exclusive of the orthodont influence, I have used the term *Prionodesmacea.* In some cases what may seem to be the chief features of the hinge as regards size and strength are orthodont, yet these I believe to be comparatively modern specializations illustrating the genéral tendency of evolutionary processes toward a teleodont hinge. In cases of doubt the sum of the characters will enable us to decide on a proper place for a given genus. It must not be supposed that, because the names suggested by a single set of characters are used to denominate the proposed orders, therefore that set of characters is to be our sole criterion. Such too hasty assumptions are a relic of the days when the immutability of species was an orthodox dogma in biology, and doom to failure any system founded upon them.

For those forms in which the various types of hinge have become harmoniously combined, though in varying proportion contributing to the final mechanism, I have selected the designation of *Teleodesmacea.* These may be regarded as the highest and evolutionally the most perfect in type of hinge, though this perfection shows itself in a variety of forms. Prionodont traces remain with most of them, but are never characteristic of the type.

The three groups I propose to call orders. It is difficult to say whether they can be compared in systematic value with orders in other classes. All that can be said is that these three divisions are discernible in the very compact and homogeneous class which includes them, and it contains no other groups of equal value or significance.

Each order as it now exists contains archaic and modern specialized types. Each indicates a tendency toward an ideal of fitness to the environment, which results in a certain parallelism of minor characters common to minor groups in each of the three orders. In each (we are coming to regard it as inevitable) certain members show affiliations with members of the other orders. In each there are certain groups which represent a relatively modern specialization carried so far as to be quite peculiar.

Pearliness or a truly nacreous character of shell-substance is a source of weakness. This kind of shell is more fully permeated with animal matter, is more liable to decay and exfoliation, and is more readily drilled by enemies than the aragonitic type of shell-substance which conchologists call porcellanous. The external prismatic layer which usually accompanies a pearly interior layer, as in *Nucula*, *Trigonia*, *Unio*, etc., is very easily disintegrated. The tendency of evolution is to promote the porcellanous type. The older groups (*Prionodesmacea* and *Anomalodesmacea*) contain all the pearly Pelecypods. Among the *Teleodesmacea* there is not a single one. Furthermore, in the two former orders the most specialized and, developmentally, the most modern forms are preferably porcellanous; those which we may reasonably regard as of more ancient type tend to pearliness. For example, in the *Anomalodesmacea* the most striking instances of specialization are the Pholads, *Tubicolæ* and certain *Myacea*, all are earthy, or at least not pearly. The *Anatinacea*, which paleontologically are very ancient, are largely pearly. The *Prionodesmacea* have few porcellanous groups, but those which show this character, such as *Ostrea* and *Pecten*, generally stand at the nearer end of a long line of progressive modification. There are exceptions to this, such as *Tindaria*, in the *Nuculacea*, which is obtrusively porcellanous. *Leda* and *Solenomya*, which retain so many archaic features in their soft parts, have almost lost the pearly layer while still falling short of the porcellanous character conspicuous in most of the *Teleodesmacea*. The Arcas, conspicuously earthy in their shells, are modern in their total characters compared with the pearly Nuculas. Turning to Gastropoda for a moment, we find that *Pleurotomaria*, one of the very earliest types of that class which can be recognized in the now existing fauna, is extremely pearly. On the whole, the relation between the two types of shell-substance if not constant enough to be called a rule, is sufficiently so to be extremely suggestive.

I have already suggested the mechanism of the infolding which resulted in the cartilage and its supporting socket. It is a very difficult task to account for the initiation of all the types of teeth. A few suggestions may be ventured upon.

The radiating or transverse corrugations which we see in ribbed shells are not merely ornamental. They serve to add strength, while they do not increase the weight, as would a corresponding thickening of the shell. A familiar example of the same principle is afforded by the corrugated sheet metal so frequently used by builders. The ends of these ribs impinge on the margin of the shell and crenulate it when the shell is thin. *Crenella* is a notable example. Many *Mytilacea* exhibit a similar structure. These crenulations of the hinge-line and margin are not to be distinguished from nascent teeth, and have frequently been described as such by naturalists. *Nuculocardia* of Orbigny is a well-known instance. The crenulations of the margin are useful in securing a close fit between the closed valves, whether at the cardinal or the basal margin. But they would be more useful at the cardinal margin, because there they would prevent sliding of the valves upon one another before they were completely closed, as do the long teeth of the *Nuculacea.* Hence it is probable that they would be perpetuated and specialized there even if the ribbing disappeared from the exterior of the valves. Great stress arising from friction and pressure resisted would tend toward the thickening, widening, and even buttressing of the cardinal margin until the hinge-plate became developed and sufficiently strong to perform its functions with success. This is one of the ways in which a Prionodont hinge might be initiated.

The Anodont hinge, to reiterate, is a weak and unsatisfactory type. Its defects could hardly continue to exist except in a burrowing and tubicolous generation. To some extent its weakness has been made up for by an asymmetry in the valves, which permits a smaller valve to fit into a larger one. This is a very successful device, as there can be, as long as the larger margin remains unbroken, no question of failure to close the valves. But the projecting margin of the larger valve is a weak feature, much more likely to get fractured than the convex combined edges of two. Once fractured, the mollusk would be defenseless until he could mend the breach Moreover, in moving about—a practice more common with Pelecypods than is generally realized—the asymmetry of the valves would be a nuisance, always tending to shift the traveller out of the line he might desire to take. We find, as we should expect, that the Anodont hinge is persistent with tribes which are borers, tube-dwellers, or burrowers—for the most part very sluggish creatures. In cases where the ventral margins of the valves do not meet, there is, of course, no especial call for a dentiferous hinge, as the valves play the subordinate part of a dorsal shield. This is the case with *Solenomya*, where the ventral hiatus is partly shielded by projecting epidermis. Most of these forms depend apparently quite as much on their activity and the protection of the walls of their burrow as they do on that afforded by the valves of the shell. A reversion of the process is seen in the case of some groups, like *Anodonta*, in which the edentulous hinge is the result of degeneration from a dentiferous type, such as *Unio.* The dentiferous forms retain their teeth in the streams and rivers, where they are subject to numerous casualties and much knocking about, while in the still water and soft mud of silent ponds the teeth vanish and the protective shell reaches its limit of practicable tenuity.

One type of "cardinal" (as opposed to the so-called "lateral") teeth would arise through the modification of an Orthodont or a Prionodont hinge at one end (as in *Macrodon*), so that part of a row of teeth originally similar would come to differ from the rest. Many *Nuculacea* show stages of such a mode of change.

Another type would arise from the plications of the hinge parallel to and induced by the formation of a fossette or process for the internal cartilage. Such teeth or plications may be observed in most Pelecypods having an internal cartilage. All stages in development of this type may be observed from the barely traceable parallel ridges of *Cuspidaria*, for instance, to the highly specialized cardinal teeth of *Mactra*.

Thus, it will be observed, the teeth called cardinals in Pelecypods are by no means all necessarily homologous, and it is even conceivable that cardinals of both types might come to be united in the same hinge.

The development of lateral teeth from transverse teeth is a very easy process, of which a full exhibit might be made by arranging in a continuous series the valves of selected *Arcacea* and *Nuculacea*. It is probable, however, that not all Orthodont dentition originated in this way. The thickening of the cardinal margin rendered necessary by the stresses involved in the mechanical operation of cardinal teeth or strong external ligaments would render parallel plication of the thickened area along the margin not only easy, but almost inevitable in some cases. The infolding of the edge of the mantle necessarily accompanying the production of a strong specialized socket for an internal cartilage would lead incidentally to occasional deposition of shelly matter in ridges parallel with the longer edges of such sockets. The greater efficiency in guiding the valves to effective closure in proportion to the increased distance from the umbonal region of such interlocking plications would tend through natural selection to the perpetuation of favorable variations and to their gradual removal farther and farther from the beaks until the most useful distance was attained.

When we consider the remarkable uniformity in hinge characters attained by the species with more perfected forms of hinge, through long series of individuals, it seems almost incredible that these results should be brought about by the action of a thin, soft film of secretive tissue which, unaided, could not hold itself erect. It is only when we remember that the result, in the main, is brought about through the action and reaction of certain definite mechanical stresses, propagated through the hard valvular skeleton, and constantly imposed upon the softer tissues, that any adequate reason for the marvelous uniformity presents itself. There are certain groups, such as the *Isocardiidæ*, in which the hinge seems still to be in what may be termed a transition state. With these no such strict uniformity prevails. While the differences are not excessive, yet the hinge of each individual specimen compared with others of the same age will show individual characteristics, and the changes which the hinge undergoes in the same individual between adolescence and old age are greater than one would ordinarily find in the whole membership of a species, say of the *Veneridæ*, taking all ages, above the larval stage, into account.

We may now proceed to consider the groups of which these orders should be made up.

To the *Anomalodesmacea* I refer the *Anatinacea*, the *Myacea*, the *Ensiphonacea* or *Tubicolæ*, the *Solenomyacea*, and the *Adesmacea*.

In the first three groups or suborders we have forms whose relationship will hardly be questioned, embracing also some instances of the most remarkable specialization of characters. To refer to a few, I may mention *Aspergillum*, *Clavagella*, *Cuspidaria*, and *Poromya*, using these names in their widest sense.

From several characters of the gills and other soft parts paralleled in the *Nuculacea*, *Solenomya* was at first affiliated by me with the Prionodonts.* On mature consideration, while admitting that the last word on this subject has not yet been put on record, I am inclined to believe that this genus is an Anodont which has retained certain archaic features of the soft parts, and represents in the *Anomalodesmacea* a survival analogous to that of the *Nuculacea* among the Prionodonts.

From a very early period the *Solenacea* have been associated with the forms now gathered in this order. Professor Verrill has called attention to the fact that *Tagelus caribæus* and its allies have the organization of *Tellinacea*, and I have removed them to the vicinity of *Psammobia*, in my Check-list of the Marine Shell-bearing Mollusks of the southeastern coast of the United States. (Bull. U. S. Nat. Mus., No. 37.) But are the *Solenidæ* to be left behind? After due consideration I can see no sufficient reason for such a course, and conclude that the united siphons and burrowing habit, with its resulting specialization, do not warrant it. I have therefore excluded them.

In the *Adesmacea* or *Pholadacea* we have the most remarkable specialization of the hinge known in the whole class. The relations of the parts are best understood by a study of the open-shelled forms like *Zirphæa crispata* or *Barnea costata*† and the young of the closed Pholads. In the adult forms of the latter, specialization has proceeded so far that the true relations of the parts are more or less masked. In *Barnea costata* we have the anterior dorsal margin of the valves reflected dorsally until the anterior adductors following the shell pass the axis of motion of the hinge and pull at the short end of the lever, tending to open the valves, instead of to close them. The posterior adductors pull in the normal way and balance the anterior ones. The ligament is reduced to an ineffective film. The cartilage remains as a survival, but reduced to such dimensions as to be practically of no use. Its elastic properties are lost and it merely serves to connect two little processes, the feeble remnants of the original fossettes. An appendage analogous to and possibly homologous with an original ossiculum has (that view being taken) revolved around the cartilage, taken its place outside of the axis of motion of the hinge, and instead of keeping the valves from crushing each other by checking the closing stress of the adductors as in *Verticordia* or *Bushia*, and other *Anatinacea*, it accomplishes the same end by locking over the reflected edges of the shell on the dorsal surface, acting like the anterior adductors on the short instead of the long arm of the lever, and, as before, in a sense opposed to the action of the adductors. Though greatly specialized and modified, this appendage retains something of the butterfly shape of a broad ossiculum.

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* Bull. U. S. Nat. Mus., No. 37, p. 26, July, 1889.

† See Proc. Acad. Nat. Sci. Philadelphia for 1889, pp. 274-76.

An appendage, sometimes called the styliform process or apophysis, with its proximal end attached in the hollow of the beaks, has been homologized by Deshayes with the cardinal teeth. In *Pholas costata* it supports the posterior oral palpus, which is very massive, and some of the internal viscera. If one of the umbonal laminæ of *Callocardia* were detached from its connection with the cardinal margin and allowed to project into the cavity of the valve it would somewhat resemble the apophysis of *Pholas*. But on this view I am at a loss to explain the present connections of this process, about the development of which little or nothing is known. How a cardinal tooth should come to be situated inside the mass of the body would seem to be hard to explain.

The environment of the Pholads is of a very special character, and the modifications of the organization march with the peculiar circumstances under which it exists. To enter into their mutual reactions would take much space and obscure the more general questions to which these remarks are addressed.

It may be added that in this order, as well as the others, the particular constituency of each of the suborders, even the number and scope of the families, must be regarded as tinged with uncertainty from the magnitude of our ignorance. To properly ascertain and correlate the data in regard to the different genera and the families of which they are the members is a labor worthy of devotion, but which will yet require a large amount of original research.

In the *Prionodesmacea* the *Nuculacea* represent an archaic type in many of their features. So far as the hinge is concerned *Arca* (*noæ* and related species) is perhaps the most fully and typically developed instance of Prionodont dentition. The Naiades declare in *Spatha* and *Iridina* their Prionodont origin, traces of which are to be seen in the transverse striation of the teeth of many species of *Unio*, even when lateral teeth have become well developed and pre-eminent. The same is true of *Trigonia*, which has many points in common with the Naiades and may perhaps be the descendant of a common ancestry. To the latter immediately *Mulleria* bears such a relation in its adult state as do the Monomyarian *Pecten* and *Ostrea* to the rest of the *Prionodesmacea* as a whole. The Prionodont character of the *Mytilacea* will not be questioned. Through them we pass to the *Pectinacea*, in which in *Spondylus* we have the finest instance of a Prionodont hinge with few teeth, as *Arca* is of one with many teeth.

The original transverse grooving of the hinge is visible on the very young valves of many species of *Pecten*, *Janira*, etc. The *Ostracea* are the last term of specialization in this line; the *Anomiacea* are brought in by the total of their characters, though so far modified as to indicate little, by the hinge, of what I suppose to be their origin. Above all it must be admitted that the *Monomyaria* and *Heteromyaria* represent not fundamental types of structure but special modifications, though some of them are geologically ancient.

The remaining forms representing the march of progress toward a mechanical perfection in hinge characters, though retaining traces (as in the striated teeth of some Mactras) of Prionodont ancestry which once dominated the dentition, constitute the order *Teleodesmacea.*

In the main, in the combination of hinge characters which they present, the most striking features are the effective manner in which the orthodont laterals and prionodont cardinal teeth are subordinated to and supplement each other's action, the occasional introduction of the internal cartilage in happy combination with the others, and the general absence of a prismatic layer and of nacre in the shell-structure and of archaic characters in the soft parts.

It is a question whether the *Rudistes* are to be considered a group apart, or, like the *Pholadacea* among the *Anomalodesmacea*, merely an erratic special development of forms related to the *Chamacea.* Leaving the question to be settled by the special studies its difficulties call for, I conclude this paper with a tabular view of the orders and suborders into which the class is divided. One group, the *Leptonacea*, stands much in need of thorough study, without which its component families and even its permanent standing must remain doubtful. With our present knowledge it is yet impossible to determine the number of families of which each suborder should be composed, or even how many groups are entitled to rank as families. But in the major groups I feel a certain amount of confidence that the present arrangement is in most respects more harmonious and in accord with the balance of characters than any of the systematic arrangements of the class which have been hitherto proposed.

SUPPLEMENTARY NOTE.—When I first began to consider the relations of the teeth and other parts of the hinge I naturally remembered the brief abstract of the important paper on the hinge of bivalves by M. Neumayr, which I had seen in the Zoological Record for 1883. I intentionally deferred a careful perusal of Neumayr's essay until I had entirely completed my own. Then a careful examination of his original afforded me great pleasure. It showed that in the matter of the influence of ribbing in promoting nascence of teeth; in the discrimination of lateral plications, arising in connection with the fossette of the cartilage from the true cardinal teeth; in the influence of the environment on the degeneration of hinge characters; in the estimate of the characters of the primitive bivalves, and some minor points, we had arrived independently at the same conclusions, and even illustrated them by identical or nearly identical examples. This is certainly strong presumptive evidence of the correctness of those inferences. In the points in which we differ it seems to me that the differences arise from the fact that Neumayr has approached the subject more from the paleontological stand-point, and has less considered or has given less weight to biological considerations, not imprinted on the shell; while in my own case, from the nature of my previous studies, I have been led to attack the problem from the other side. Recent investigations, available only since the date of Neumayr's paper, have thrown much light on the inosculation of characters not before known to interlace. Neumayr, also, from my stand-point, has insufficiently grasped the importance of the different processes involved in the production of the internal cartilage and its shelly coefficients on the one hand and the denticulation of the hinge margin on the other. These two processes, though they must often have proceeded simultaneously in the same genus, were not necessarily connected, except in so far as by resulting stresses each might react on the hinge-product of the other. So instead of having a Desmodont type of hinge as opposed to a Prionodont, and, as Neumayr would say, a Heterodont (Teleodont) type, we may have either an Anodont (Paleoconch), a Prionodont (Taxodont), or a Teleodont (Heterodont) type of hinge, either with or without an internal cartilage and its accessories.

By the elaboration of this view, as attempted in the foregoing discussion, it seems to me the discrepancies so evident in Neumayr's system have been avoided, the types of hinges assigned their proper weight in the system, while those biological relations which are not fully reflected in the shelly parts have not been slighted; though inevitably numerous improvements in detail will suggest themselves to students, or be effected by a future expansion of our knowledge.

As regards the Rudistes, if, as claimed by Woodward and others, they possessed an internal cartilage, it is probable that they must form a specially modified and extraordinary ramification of the *Chamacea*. If, however, as is claimed by some authors, there was no internal cartilage or external ligament, no hinge, properly speaking, and the smaller valve simply rose and fell vertically under the control of adductor muscles, guided by interlocking processes, it is evident that this would establish an inter-relation between the valves, unlike anything among the Pelecypods, and only comparable, perhaps, with that of certain operculated corals. In the latter case the Rudistes would have to be regarded as ranking at least among the subclasses, if as Mollusca at all. My own impressions are that the first-mentioned view is the more probably correct one.

The opinion is occasionally expressed in scientific literature that the shell is a "mere secretion of the mantle." This usually proceeds from some person who has not well studied the molluscan shell, or who is of the age when one knows more than at any subsequent period.

Such a statement is one of those half-truths which are more dangerous than pure error, since the ballast of truth they contain will enable the error to navigate some distance, while the unfreighted error would capsize at once.

The shell is in one sense the product of secretion from the mantle, as the mammalian tooth is derived from the ectoderm of the jaw, or the skeleton from the periosteum and cartilages. Both are that and much more. It would be as reasonable to say that a steam-boiler, in process of construction, is the product of the boy inside who holds the rivet-heads, as to claim that the shell has no more significance than is implied in the term "secretion of the mantle."

The original theoretic protoconch may have been so, but as soon as it came into being its development was governed by the physical forces impinging upon it from all sides, and through it influencing the growth and structure of the soft parts beneath. The Gastropod shell is the result of the action and reaction between the physical forces of the environment and the evolutionary tendencies of the organic individual. In the Pelecypod we have the mechanical stresses and reactions of one valve upon the other added to the category of influences. To a considerable extent it is doubtless as true that the animal is molded by its shell as it is that the shell is shaped by the soft parts of the animal. This results in that correlation of structure which has enabled students to, in the main, correctly judge of the relations of mollusks by their shell characters, when the latter were intelligently studied and properly appreciated.

Class PELECYPODA.

I. Order ANOMALODESMACEA.

Suborders.

1. **Solenomyacea.**
2. **Anatinacea.**
3. **Myacea.**
4. Ensiphonacea.
5. Adesmacea.

II. Order PRIONODESMACEA.

Suborders.

1. **Nuculacea.**
2. **Arcacea.**
3. **Trigoniacea.**
4. **Naiadacea.**
5. Mytilacea.
6. Pectinacea.
7. Anomiacea.
8. Ostracea.

III. Order TELEODESMACEA.

Suborders.

1. Tellinacea.
2. Solenacea.
3. Mactracea.
4. Cardiacea.
5. Carditacea.
6. Chamacea.
7. Tridacnacea.
8. Leptonacea ?
9. Lucinacea.
10. Isocardiacea ?
11. Veneracea.

? Rudista.

DESCRIPTIONS OF THE SPECIES.

Order PRIONODESMACEA.

Suborder PECTINACEA.

Family PECTINIDÆ.

Genus **PECTEN** Müller.

Pecten glyptus Verrill.

Plate VIII, Figs. 2, 3.

Pecten glyptus Verrill, Trans. Conn. Acad. Sci., v, p. 580, July, 1882.
Pecten Tryoni Dall, Bull. Mus. Comp. Zoölogy, XVIII, p. 438, June, 1889.

HAB.—U. S. Fish Commission Station 2602, north latitude 34° 38′, west longitude 75° 33′, off the coast of North Carolina in 124 fathoms, sand; bottom temperature 61° F.; and off Martha's Vineyard in 85 to 120 fathoms.

Shell large, thin, both valves about equally convex, right valve more brilliantly colored; ears subequal, hinge line straight; beaks small, pointed, not prominent; orb of the shell somewhat oblique, anterior portion produced downward and forward, margin simple, entire, sharp; sculpture of wide little-elevated ribs, about seventeen in number, each with a central keel which is sharp and slightly serrate over two-thirds of the surface but becomes obsolete toward the margin; this keel is colored more deeply than the rest of the rib, and the color may be alternately concentrated at the prominences and fainter between them. In the specimens observed it is either deep rose color or a warm orange-brown, fading gradually on each side of the keel of the ribs, while the interspaces are pale or white, with faint narrow radiating lines of the color; on the right valve, except along the hinge line, the auricles are pale; the minute sculpture consists, on this valve, of fine radiating grooves, about a dozen between the carinæ of each pair of ribs, across which are carried in fine scallops sharp little-elevated lamellæ; these lamellæ are easily felt, but visible only with some magnification; the left valve shows (in a rose-colored specimen) very little color, and that a mottled orange-brown confined chiefly to the ribs of the apical third; the ribs are keeled for a shorter distance than in the right valve, are generally fainter, while the microscopic sculpture is composed only of fine concentric incremental lines which have a silky appearance; the hinge line of the left valve slightly overrides that of the other valve and is serrate by fine transverse scales; the ears are subequal, the byssal notch shallow and rounded, without a pectinium; there are a few elevated radiating lines on these ears; internally the hinge line is nearly smooth, the cartilage pit small and narrow, two short, stout auricular liræ radiate from it; the interior of the shell is white; the interspaces between the external ribs are defined by fourteen or fifteen pairs of elevated liræ strongest distally and ending close to the margin. Maximum altitude of shell 60.0; maximum longitude 60.0; longitude of hinge line 25.0; diameter of closed valves 11.0 mm.

This fine species was not at first recognized from Professor Verrill's rather brief diagnosis, which was not accompanied by a figure; and in this way a new name was applied to the species in a preliminary notice of it. More mature consideration, though without comparison of specimens, leads me to the belief that Professor Verrill's name applies to the shell before me.

Although a ribbed species, the internal liræ are very much like those of *Amusium*, and this shell adds one more to the links which connect the various groups of the old genus *Pecten* together. A careful comparison has been made with European species, and there can be no doubt of the distinctness of this from any of them.

Pecten exasperatus Sowerby.

The collections made on the voyage contain a valve of *Pecten exasperatus* Sowerby (*P. fuscopurpureus* Conrad) from Station 2762, in 59 fathoms, mud, off Rio Janeiro. This considerably extends the southward range of this species beyond the localities previously known.

Pecten effluens Dall.

Plate XI, Fig. 9.

Pecten effluens Dall, Bull. Mus. Comp. Zoöl., XII, p. 219, September, 1886.

This hitherto unfigured and very delicate little species was originally dredged off Havana by Sigsbee in 127 fathoms. Since then it has been obtained in 300 fathoms off Cape San Antonio, Cuba, by Dr. Rush and at U. S. Fish Commission Station 2646, in 85 fathoms, sand, off Cape Florida.

The valves may be pale or even bright lemon-yellow, orange or scarlet, always somewhat translucent. The surface presents an excellent example of the microscopic *Camptonectes* striation. The specimen figured is 26.0 mm in length.

Section PSEUDAMUSIUM H. & A. Adams.

Pecten (Pseudamusium) strigillatum Dall.

Plate XI, Fig. 2.

Pseudamusium strigillatum Dall, Bull. Mus. Comp. Zoöl., XVIII, p. 438, June, 1889.

Shell small, white, thin, rounded, with a straight hinge-margin; left valve inflated, the posterior auricle narrow, separated by a deep narrow byssal notch from the rest of the margin; right valve flatter, the posterior auricle well defined, small; both valves similarly sculptured with nearly equidistant thin lamellæ, which, when perfect, curve forward and touch the rising curve of the next succeeding lamella; an absolutely perfect specimen would therefore present a series of equal, smooth, concentric waves, falling almost vertically from the anterior hinge margin and curving in a subcircular sweep around to the depression which marks off the posterior auricle in either valve. Practically, however, the fragile lamellæ never retain more than traces of their perfect state and present a series of very sharp elevated concentric laminæ following the lines of growth and separated by narrow nearly equal intervals, averaging on the whole four or five to the length of a millimeter, radially measured; the umbones are small and prominent, reaching slightly above the cardinal margin; the interior is smooth and polished; there is no radiating sculpture; the ligament is small and subcentral; there are no transverse rugæ on the hinge margin, and no internal liræ. Maximum altitude of the shell 9; maximum latitude 8.5; diameter, 4.4^{mm}.

HAB.—U. S. Fish Commission Station 2383, in 1,181 fathoms, mud, between the delta of the Mississippi and Cedar Keys, Gulf of Mexico; bottom temperature 39°.8 F.; Station 2751, off St. Kitts, in 687 fathoms, ooze; and 2760, 90 miles north of Ceara, Brazil, in 1,019 fathoms, temperatures 39°.9 and 39°.4, respectively.

This very simple and yet very characteristic little species seems to stand in need of no comparisons, as it is not sufficiently similar to be easily mistaken for any of the known species.

Family LIMIDÆ.

Genus LIMA Bruguière.

Subgenus LIMATULA S. Wood.

Limatula setifera Dall.

Plate XIV, Fig. 10.

Limatula setifera Dall, Bull. Mus. Comp. Zoöl., XII, p. 224, 1886.

HAB.—From North Carolina to Barbados in 50 to 450 fathoms, collected by the *Albatross* at Stations 2612 and 2646.

Genus **LIMÆA** Bronn.

Limæa Bronniana Dall.

Plate XIV, Fig. 9.

Limæa Bronniana Dall, Bull. Mus. Comp. Zoöl., XII, p. 226, 1886.

HAB.—North Carolina to Barbados in 15 to 804 fathoms, U. S. Fish Commission Stations 2596, 2612, and 2619 being among the localities.

Suborder MYTILACEA.

Family MYTILIDÆ.

Genus **CRENELLA** Brown.

Crenella (decussata var.?) divaricata Orbigny.

Crenella decussata (Montagu) Dall, Bull. Mus. Comp. Zoöl., IX, p. 116; XII, p. 235, 1886.

Nuculocardia divaricata Orbigny, Moll. Cuba, II, p. 311, Pl. XXVII Figs. 56–59, 1845.

This little shell—described from the Antilles by Orbigny, and indistinguishable from specimens of *C. decussata* of the same size, except that it is usually whiter—never reaches the size of northern specimens of *C. decussata*. The latter is found as far south as Catalina Island, off the coast of Santa Barbara County, California. The presence of a fresh specimen of *C. divaricata* containing the animal, in dredgings at Station 2805, in 51 fathoms, mud, Panama Bay, was therefore not altogether surprising. It is the first record of the Antillean form on the west coast of America and adds to the probabilities of its being merely a tropical race of *C. decussata*.

Suborder NUCULACEA.

Family LEDIDÆ.

Genus **MALLETIA** Desmoulins.

Malletia goniura sp. nov.

Plate X, Fig. 10.

Shell small, rather full, with a brilliantly polished olivaceous epidermis, and faint sculpture of incremental lines; umbones not prominent; anterior end rounded; base nearly straight; posterior extremity bluntly truncate with a double flexure, caused by two well-marked ridges extending from the beaks to the extremity of the shell; lunule and escutcheon linear or none; ligament external, short, black; hinge line straight behind the beaks, descending slightly in front of them, with nineteen anterior and twenty-five posterior, small, short V-shaped teeth, the two series separated by a short edentulous space; interior polished, slightly iridescent; muscular scars rather large, faint; the pallial line obscure, with a large rounded sinus; margins simple, smooth. Longitude of shell 15.5; altitude, 9; diameter, 6^{mm}.

HAB.—U. S. Fish Commission Station 2793, off the coast of Ecuador in 741 fathoms, mud; bottom temperature 38°.4 F.

This species is most like *M. arruana* Smith from the Arru Islands, but that species has the upper posterior corner beveled off and no longer angular, which makes a marked difference in the outline of the shell. *M. obtusa*, which has somewhat the same form, wants the marked furrows of the posterior end of this species.

Malletia (Tindaria?) æolata sp. nov.

Shell small, thickish, pale straw color, subrectangular; surface smooth and polished at the umbones, gradually becoming strongly concentrically ridged with rounded narrow ridges separated by mostly linear interspaces; anterior end longer, nearly evenly rounded, a little produced below; posterior end shorter, longest above, obliquely truncate with a concave wave between the upper point and the beginning of the little-curved base; beaks full, not prominent; no visible lunule or escutcheon; hinge margin broad, with eleven anterior and eight posterior W-shaped teeth, of which four or five on each side are not developed; ligament central under the beaks, small, wholly external to the tooth line; interior polished, scars and pallial line rather obscure. Maximum longitude 4.5; altitude 3; diameter 2.5; vertical of beaks from anterior end 2.8^{mm}.

HAB.—Station 2754, in 880 fathoms, ooze, east from Tobago; temperature 37°.9 F.

Nearest to the young of *M. australis* or the adult *M. excisa*, but of different form from the latter, stouter and more rectangular and less deeply notched.

Malletia (Tindaria) amabilis Dall.

Malletia (Tindaria) amabilis Dall, Bull. Mus. Comp. Zoöl., XVIII, p. 436, Pl. XL, Fig. 8, June, 1889.

This species was obtained from Stations 2751 and 2754, in 607 fathoms, ooze, off St. Kitts, and 880 fathoms, ooze, east from Tobago; temperatures 39°.9 and 37°.9 F., respectively.

Malletia (Tindaria) agathida sp. nov.

Plate XIII, Fig. 10.

Shell small, stout, white, with prominent umbones; produced and rounded before, shorter and pointed behind, with close, strong, subequal, uniform concentric ridges; base rounded, slightly concavely waved in front of the angle of the rostrum, corresponding to a marked depression in front of an equally prominent ridge which extends from the umbo; the concentric ridges are about equal to their interspaces; there is a pale yellow concentrically finely wrinkled epidermis; the tips of the umbones are full, smooth, and polished; there is a lanceolate, smoothish lunule bounded by an obscure ridge, and a shorter and narrower escutcheon bounded by a faint ridge, outside of which is a faint depression; on either side of the beaks is a narrow, flattened area, recalling that of *Limopsis*, but much smaller and narrower; in the middle of this, just under the beaks, is a very small socket for the ligament, which is wholly external to the line of the teeth, just as in *Palæoneilo;* there are eleven developed and three obsolete anterior teeth and about twelve posterior teeth, of which two or three are very small; the two sets are separated by a very narrow, smooth space, but there is no cartilage; the muscular scars are deep, the pallial line obscure, the margin simple, and the valves rather thick; maximum longitude of shell 5.5; maximum altitude 4.5; diameter 3.1^{mm}; the beaks are over a point on the line of maximum length, which is 3.25^{mm} from the anterior end.

HAB.—Station 2751, south from St. Kitts, in 687 fathoms; and 2754, east from Tobago, in 880 fathoms; temperatures 37°.9 to 39°.9 F.

This species has much the outline of *Modiolarca exilis* H. and A. Adams (see Zool. Kerguelen Id., Mollusca, by E. A. Smith, Transit of Venus Expedition, Zool., Plate IX, Fig. 24), and resembles in stoutness and sculpture *Leda Brookei* Hanley, as figured in the Thesaurus.

Malletia (Tindaria) acinula sp. nov.

Plate XIII, Fig. 4.

Shell small, subquadrangular, white, with the anterior end shortest, and the surface sculptured with strong, close, subequal, rounded concentric waves, separated by linear interspaces; base produced in the middle, rounded; anterior end short, rounded; posterior end longer, with a rounded point, but not rostrate; beaks apical, but not prominent; lunule and escutcheon subequal, small, narrow, impressed, rather short, with no bounding elevated line or groove; ligament small, longer than high, directly under the beaks, external to the tooth line, and visible externally in the closed shell; anterior part of the hinge with eight, posterior part with ten, V-shaped teeth, of which two or three on each side are very small; scars well marked, impressed; pallial line obscure, arcuated in front of the posterior adductor; margin of the valves plain, interior polished, shell rather thick; maximum longitude of shell 5.0; maximum altitude, 4.2; diameter 3.5; distance of vertical, drawn from the beaks, from anterior end, 1.5^{mm}.

HAB.—With the last and also at Station 2760, in 1,019 fathoms, brown clay, ninety miles north from Ceara, Brazil; temperature 39°.4 F.

This shell has much the outline of *Leda quadrangularis* Dall, but is proportionally higher and shorter, with more prominent and regular concentric sculpture.

Malletia (Tindaria) virens sp. nov.

Plate XIII, Fig. 3.

Shell small, inflated, thin, closely, minutely, concentrically ridged, with a green or olive-green epidermis; anterior end shorter; base evenly rounded, beaks full but not prominent; outline of the shell recalling *Callista;* anterior end evenly rounded, posterior produced, with a very obtuse rounded point, not rostrate; ligament under the beaks, but extending further behind than in front of them, wholly external to the tooth line, which is continuous below it; anterior teeth eight, posterior ten, with three or four undeveloped additional teeth under the beaks on each side; teeth prong-shaped; scars obscure, pallial line invisible; shell very thin, cardinal margin very weak and narrow. Maximum longitude 4.5; altitude 3.5; diameter 2.5; vertical of the beaks, 2^{mm} from the front margin.

HAB.—Stations 2781, 2782, 2783, and 2785, in 122 to 449 fathoms, mud, on the west coast of Patagonia; temperatures 47° to 50° F.

This species is exceptional for its thin shell and very green epidermis I have not been able to distinguish any lunular area or escutcheon.

Genus YOLDIA Mörch.

Yoldia scapania sp. nov.

Plate XIII, Fig. 6.

Shell elongated, polished, smooth, whitish with a pale yellowish epidermis, the beaks very inconspicuous, hardly raised above the level of the slightly angulated hinge-line; base nearly straight; the anterior end rounded above, more oblique toward the base; the beaks slightly more than one-third of the way from the anterior to the posterior end; posterior end bluntly rounded as in a *Siliqua ;* interior smooth, white, with a deep rounded pallial sinus and rather large rounded muscular scars; hinge with about twenty-eight very small V-shaped posterior and twenty-five anterior teeth, the anterior ones being crowded more closely; there is a greater difference in the length of the hinge-line on each side of the ligament pit than the numbers would imply; ligament wide, low, subtriangular, wholly internal; margins of the valves smooth, sharp; maximum longitude of shell 18.25; altitude 9; diameter 5.6^{mm}.

HAB.—U. S. Fish Commission Station 2762, east of Rio Janeiro, in 59 fathoms, mud; bottom temperature 57° F.

This species is remarkably soleniform, gaping slightly at either end, mostly at the posterior end; it is very evenly inflated and the beaks are so inconspicuous as to be practically almost indiscernible. It is most like *Y. solenoides* Dall, which is smaller, has the posterior end less blunt and slightly narrower; is a smaller shell, with more central umbones and a few concentric grooves near the base. In the present species, as in the *Y. solenoides*, there is a narrow lunule and escutcheon bounded by a shallow groove, but in the latter this groove indents the anterior margin, while in *Y. scapania* it does not. There are a few obscure radiations, and the incremental lines are more conspicuous toward the middle basal part, but the sculpture, if such it can be called, is hardly noticeable. The teeth are larger in *Y. solenoides*, though it is a much smaller shell.

Yoldia pompholyx Dall.

Plate XIII, Fig. 8.

Yoldia pompholyx Dall, Bull. U. S. Nat. Mus. No. 37, p. 44, No. 151, 1889.

Shell small, rounded, polished, inflated, smooth except for incremental lines, covered with an extremely thin grayish green epidermis; subtranslucent when fresh, ashy or white when weathered; a pair of very faint ridges in front of and behind the beaks indistinctly indicate areas corresponding to lunule and escutcheon; beaks rounded, inconspicuous; shell entirely closed when the valves are shut; ligament nearly central, its upper surface slightly exposed externally between the valves; interior smooth; hinge-line narrow, roundly arched with seven anterior and eight posterior teeth of normal form and a well-marked pit or fossette central between the beaks; margins smooth; maximum longitude of largest valve 4^{mm}; longitude of another (pair) 3.5; altitude 3; diameter 2^{mm}.

HAB.—U. S. Fish Commission Station 2668, in 294 fathoms, gravel, off Fernandina, Fla.; temperature 46°.3 F. Also by Dr. W. H. Rush, U. S. Navy, off Havana in 1,024 fathoms, mud, and off the Fowey Rocks, east Florida, in 205 fathoms.

This curious little species has much the external form of Jeffreys' *Glomus*, but has the regular hinge of the small rounded Yoldias.

Genus LEDA Schumacher.

Leda cestrota sp. nov.

Plate XIII, Fig. 7.

Shell thin, compressed, elongated, rostrated, translucent white, with a pale gray or olive epidermis, which is generally mostly lost; umbones hardly raised above the hinge-line, pointed, inconspicuous, compressed; base forming a shallow reversed arch, meeting the anterior curve of the upper edge in a rounded point; posterior upper margin nearly straight, becoming slightly concave toward the end of the rostrum; rostrum longest above, obliquely truncate, its basal margin slightly concave, then swelling into the curve of the base; sculpture of numerous thin, sharp, elevated concentric lamellæ, prominent anteriorly and near the base, less so on the cheeks of the valves and obsolete near the rostrum;

radiating sculpture of a ridge bounding the lunule over which the lamellæ pass, becoming finer and then obsolete toward the pouting cardinal margin; also, a ridge bounding the escutcheon, and a second less obvious thread from the beak of each valve to the lower angle of the rostrum; the former shows by small elevated, pointed scales the influence of the lamellæ, slight traces of which also appear on the second ridge; the escutcheon is long, narrow, and smooth, with pouting lips, and there are no developed lamellæ between the ridges outside of it; shell internally polished, showing no scars; there is no mesial ridge in the rostrum; cartilage large, black, triangular, posteriorly inclined, wholly internal; teeth small, about forty anterior and fifty posterior to the beaks, of which seven to nine on each side are undeveloped; on the anterior side, between the anterior margin of the fossette and the tooth-line proper, is a flat space over which these undeveloped teeth are widened out as transverse, but little elevated, ridges; maximum longitude of shell, 25.5; longitude from vertical of beaks to end of rostrum, 17; maximum altitude of shell, 8.75; diameter, 3.75^{mm}.

HAB.—Station 2145, near Colon (Aspinwall), in 25 fathoms, mud.

This is nearest *L. concinna* Adams, from New Zealand, but is proportionally more elongated and pointed posteriorly, and more compressed.

Leda platessa sp. nov.

Shell thin, flat, smooth, whitish, nearly straight; sculpture only of faint incremental lines; epidermis pale straw-color, translucent, polished; beaks small, bulbous, but inconspicuous, or hardly elevated above the hinge-line; lunule so narrow as to be obsolete; escutcheon extremely narrow, long, bordered by a faint thread, below which is a still fainter one; base arcuate; anterior end evenly rounded, short; posterior end straight, squarely, not obliquely, rounded-truncate; interior polished, rostrum with a mesial septum most elevated distally, nearly central; fossette narrow, elongated, parallel with the cardinal margin; teeth very small, anterior series with four undeveloped and seven elevated teeth; posterior series with about twenty-five developed and eight or nine (?) undeveloped arched teeth; interior of shell polished, not showing the scars. Maximum longitude of shell 10.3; altitude 4.4; diameter 2; vertical of the beaks from anterior end 3.25^{mm}.

HAB.—Station 2762, east from Rio Janeiro, in 59 fathoms, mud; temperature 57° F.

The nearest relative of this shell is *Leda Carpenteri* Dall, from the eastern coast of the United States and the Antilles. The latter has the rostrum much more slender and more recurved, the lunule, and especially the escutcheon, wider and better defined, and the curve of the anterior end more pointed in the middle. The central part of the base below the beaks is also, in harmony with the general curvature of the shell, proportionally more produced. The number of teeth on the hinge-line is smaller, the fossette shorter and wider, and the rostral septem more dorsally situated.

This species recalls, to some extent, *Leda Bushiana* Verrill, but that species is more elevated and has sparse, prominent concentric lamellæ over part of its surface.

Leda pontonia sp. nov.

Plate XIII, Fig. 5*b*.

Shell stout, strong, inflated, with a thin ochre-yellow or pale olive epidermis and recurved, pointed, posterior end; beaks approximate, full, incurved, not high, slightly anterior; anterior end evenly rounded, produced; posterior end vertically compressed, produced, recurved, pointed but not rostrate; base evenly arcuate; radiating sculpture of occasional faint microscopic striations near the ends of the shell, usually absent, and a marked but not sharp-edged ridge in each valve, extending from the beak to the posterior point and bounding the posterior dorsal area in each valve; concentric sculpture of numerous fine regular continuous rounded threads, separated by narrower grooves; this sculpture, however, becomes suddenly obsolete on the cheeks of the valves and in front of the ridges above mentioned; the threads are stronger above and behind the ridges, but fade out in a central cordate area which, though not impressed, may be taken to represent the escutcheon; there is no obvious lunule; interior polished, muscular and pallial scars faint, the former small; pallial sinus shallow, small, and terminal; teeth V-shaped, anterior sixteen, posterior thirteen, all developed; fossette internal, deep set, subtriangular, short; maximum longitude of shell 14.5; altitude 10; diameter 6.8; vertical of beaks behind the anterior end 6.25^{mm}.

HAB.—Stations 2807 and 2808, in 812 and 634 fathoms, mud and sand, near the Galapagos Islands, Pacific Ocean; temperatures 38°.4 and 40° F.

This is a remarkably plain, stout, and simple species, notable for its recurved tip, broad, flattened posterior dorsal area and arcuate base. It has somewhat the form of *L. chuva* Gray, but is proportionally longer and has a different sculpture.

Family NUCULIDÆ.

Genus **NUCULA** Lamarck.

Nucula Verrillii Dall.

Plate XIV, Fig. 4.

Nucula Verrillii Dall, Bull. Mus. Comp. Zoöl., XVIII, p. 248, 1886.

Nucula trigona Verrill, Trans. Conn. Acad., VI, p. 438, 1885, not of Bronn, 1849, or Seguenza, 1877.

HAB.—Off Nantucket at Station 2194 in 1,440 fathoms, and off the coast of Maryland at Stations 2228 and 2229 in 1,582 and 1,423 fathoms.

(Verrill). Also at Station 2754 in north latitude 11° 40′ and west longitude 58° 33′ east from Tobago in 880 fathoms, ooze, and Station 2760, 90 miles north from Ceara, Brazil, in south latitude 12° 7′ and west longitude 37° 17′ in 1,019 fathoms, broken coral bottom; temperatures 37°.9 to 39°.4 F.

This species recalls the Miocene *N. dolabella* H. C. Lea from Virginia.

Nucula crenulata A. Adams.

Nucula crenulata A. Adams, P. Z. S., 1860, p. 52.

N. culebrensis E. A. Smith, Chall. Rep., Lamellibr, p. 228, Pl. XVIII, Figs. 11, 11*a*, 1885.

N. crenulata Dall, Bull. Mus. Comp. Zoöl., IX, p. 123, 1881, XII, p. 247, Pl. VII, Fig. 2, 1886.

HAB.—Gulf of Mexico and Antilles, also Station 2785, in south latitude 48° 9′ and west longitude 74° 36′, on the west coast of Patagonia in 449 fathoms, mud; temperature 46°.9 F.

This locality greatly increases the southward range of this species and carries it into the Pacific. The identification seems satisfactory.

Nucula cancellata Jeffreys.

Nucula reticulata Jeffreys, 1876, not of Hinds.

N. cancellata Jeffreys, P. Z. S., 1881, p. 951. Verrill, Trans. Conn. Acad., VI, 231, 1884.

HAB.—Europe, Azores, New England, near Georges' Banks and southward to Martha's Vineyard. Also at Station 2754, east from Tobago, in 880 fathoms, ooze, temperature 37°.9, north latitude 11° 40′ and west longitude 58° 33′.

The known southward extension of this species is greatly enlarged by the specimens dredged as above mentioned.

Nucula cymella Dall.

Plate XIII, Fig. 1.

Nucula cymella Dall, Bull. Mus. Comp. Zoöl., XII, p. 246, 1886.

HAB.—Yucatan Strait in 540 fathoms. Florida Straits. Also at Station 2135, in 250 fathoms, hard coral bottom, south of Cuba, in latitude 19° 56′ north and longitude 75° 47′ west; Station 2754, east from Tobago, in 880 fathoms; and Station 2760, 90 miles northward from Ceara, Brazil, in south latitude 12° 7′ and west longitude 37° 17′, in 1,019 fathoms, broken coral; temperature 38°.4 F.

The last station extends the known range of this species nearly 2,000 miles to the southward of previous stations.

Nucula callicredemna sp. nov.

Plate XIII, Fig. 9.

Shell rather large when adult, thin, compressed, with a polished yellowish-olive uniform epidermis, radiating and concentric sculpture; form of adult ovoid, recalling *Nucula niponica* E. A. Smith (Chall. Rep., Lamellibranchs, Pl. XVIII, Fig. 8) but proportionally higher; beaks prominent, recurved, frequently eroded; radiating sculpture of numerous fine, rather distant, sharp threads, more crowded near the beaks, broader and less sharp near the anterior and posterior basal margin, not dichotomous; concentric sculpture of narrow, rather short, discontinuous and irregularly placed ripples, strongest and more irregular near the base, more crowded and regular and much less prominent near the beaks, sometimes altogether or nearly absent, especially in the young; lunular region impressed but not circumscribed, rather short and broad, with a shallow flexure just outside of it; escutcheon long, narrow, obscure; interior nacreous, polished, the basal margin closely, deeply, and sharply fluted, at all ages; anterior tooth-line concavely curved with nine teeth, all developed; posterior series convexly moderately curved with nineteen developed teeth rather conical and sparsely set; fossette shaped like the operculum of *Fusus*, curved in harmony with the dorsal margin, wholly internal; maximum longitude of adult 12.5; altitude 9; diameter 5.5; vertical of beaks from anterior end 2.75^{mm}. Young shell, longitude 7.25; altitude, 5.5; diameter 3.5^{mm}.

HAB.—Station 2754, east of Tobago, in 880 fathoms, ooze; temperature 37°.9 F.

This elegant shell is quite noticeable for its thin and light character, its continuous fine sharp radii, and its narrow though not flattened form. The young are more triangular, smoother, and proportionally more plump, some of them recalling at first sight the adult *N. Verrillii* Dall. The internal fluting is particularly marked and sharp and has suggested the specific name. There is no species which closely resembles this form, though it belongs to the group which contains *N. crenulata*, *cancellata*, *decussata*, etc.

Suborder ARCACEA.

Family ARCIDÆ.

Genus **ARCA** Linné.

Arca jamaicensis Gmelin.

Arca barbata Linné.

The above species were collected at the Abrolhos Islands off the coast of Brazil near Bahia.

Arca Noæ Linné.

Arca reticulata Gmelin.

Arca Adamsi Shuttleworth.

The three preceding species were collected at Station 2758, 90 miles southeast from Cape San Roque, Brazil, in 20 fathoms, shelly bottom, about 419 miles south of the equator. *A. reticulata* and *A. Adamsi* were also obtained at the Abrolhos Islands.

Arca glomerula Dall.

A. glomerula Dall, Bull. Mus. Comp. Zoöl., IX, p. 121, 1881; XII, p. 241, Pl. VIII, Figs. 9, 9*a*, 1886.
A. inæquisculpta E. A. Smith, Chall. Rep., Lam., p. 267, Pl. XVII, Figs. 8*a*–8*c*, 1885.

This species was obtained at Station 2750, in 497 fathoms, sand, off the island of St. Bartholomew, West Indies; temperature 44°.4.

Arca pectunculoides var. orbiculata Dall.

A. var. *orbiculata* Dall, op. cit., IX, p. 121, 1881; XII, p. 210, Pl. VIII, Fig. 5, 1886.

This species was obtained at Station 2751 in 687 fathoms, globigerina ooze, south of St. Kitts, West Indies; temperature 39°.9 F.

Genus **PECTUNCULUS** Lamarck.

Pectunculus undatus Linné.

P. undatus (Linné) Dall, Bull. Mus. Comp. Zoöl., XII, p. 238, 1886.

This species was obtained at Station 2758, 90 miles southeast from Cape San Roque, Brazil, in 20 fathoms, shelly bottom. South of this station where the genus occurred it was represented by the Patagonian form which occurs on both coasts of the southern part of South America.

Order TELEODESMACEA.

Suborder CARDITACEA.

Family CRASSATELLIDÆ.

Genus **CRASSATELLA** Lamarck.

Crassatella floridana Dall.

Plate XI, Fig. 4.

Crassatella floridana Dall, Bull. Mus. Comp. Zoöl., IX, p. 131, 1881; XII, p. 256, Pl. VI, Fig. 12, 1886.

HAB.—Gulf of Mexico and southeastern coasts of the United States at U. S. Fish Commission Stations 2372, 2409, 2410, 2595, 2596, 2597, 2598, 2604, 2606, 2607, 2608, 2610, and among the Florida Keys in 3 fathoms, living, by Lieut. J. F. Moser, U. S. Navy. The species ranges in depth from 3 to 50 fathoms, is commonest in about 25 fathoms, and has been found in temperatures of 73°.5 to 80° F.

This fine species was originally described and figured from a young shell. The adults obtained as above by the U. S. Fish Commission enable me to figure the adult. The largest valve obtained measured 78^{mm} long and 57^{mm} high. The complete shell must have had a diameter of about 31^{mm}. When fresh it is covered with a bright reddish brown epidermis, which becomes fibrous after death and maceration or in very aged specimens. The margins are smooth at all ages. In aged specimens the outside longitudinal grooving becomes obsolete near the margin. The interior in fresh specimens is pink, white, or pinkish chocolate, darker behind; sometimes of a rich salmon color. The species does not agree with any of Conrad's Tertiary species, and is entirely distinct from the *C. antillarum* Reeve, the only other recent species of the true Crassatellas yet known to inhabit this region. It has not yet been found in the southeastern Antilles.

Family ASTARTIDÆ.

Genus **CIRCE** Schumacher.

Subgenus GOULDIA C. B. Adams.

Gouldia cerina C. B. Adams.

This species was collected at Station 2758, 90 miles southeast from Cape San Roque, Brazil, in 20 fathoms, shelly bottom. This is by far the most southern habitat for the species yet recorded.

Suborder LUCINACEA.

Family UNGULINIDÆ?

Genus **CRYPTODON** Turton.

Cryptodon barbarensis Dall.

Plate VIII, Fig. 9.

Shell white, superficially chalky, rather compressed, rounded below, the beaks not very prominent; the surface is sculptured only with incremental lines; there is a rather large impressed lunular area not circumscribed by a line; behind there is an upper, narrow and deep radial depression with a lower, wider and less marked second one, which make corresponding flexuosities of the posterior margin; a narrow rather deep groove runs near the margin outside the ligament marking off a narrow elongated escutcheon; interior white, unpolished; hinge edentulous. Maximum longitude of shell 17; altitude 17; diameter 10^{mm}.

HAB.—U. S. Fish Commission Station 2840, off the Santa Barbara Islands, California, in 276 fathoms, green mud.

This fine species is nearer *C. Sarsii* than any other, but has decidedly more elevated and narrower beaks. It is probable that all these shells should be called *Axinus*, as there can be little doubt that his fossil type really belongs to this group. As long as even that little exists, however, it is a question whether Sowerby's name should be adopted.

Soft parts.—The foot is extremely slender (0.5^{mm}), with a small spindle-shaped dilation at the distal end, circularly rugose, and about 40^{mm} long, as contracted in alcohol. The gills are as long as the shell, or nearly; the stem has a dorsal and a ventral lamina, and the dorsal lamina is reflected outward and downward, until its lower margin is on a level with the stem. There is only one pallial and branchial opening, with the edges posteriorly thickened or infolded but nearly smooth. The anal opening has no tube, but forms a simple long ovate slit. The gills are free, except proximally, over two-thirds of the whole length is unattached. The mouth is small, with a narrow raised edge like a Polyzoon epistome; but no palpi. The ovarian and hepatic lobules are attached on each side of the foot and ramify from a central area of attachment in a very large number of short stout spongy lobules, recalling the digitations of some keratose sponges. The ova are minute and yellowish. The hepatic granules are dark brown or grayish. The whole mass of the genito-hepatic organs nearly fills the mantle cavity, and is larger than all the rest of the soft parts put together. These lobules are not like the pyriform projections of *Myonera*, each of which projects singly from the rounded surface of the visceral mass, and probably subsides after the period of ovulation. In *Cryptodon* the whole mass on each side arises from a single small area, and digitates afterward.

Cryptodon fuegiensis sp. nov.

Plate XIV, Fig. 2.

Shell large, white, thin, suborbicular; concentric sculpture of incremental lines; radiating sculpture of one sharp groove near and parallel with the posterior hinge-margin, its termination indenting the margin, and a wider shallow sulcus below it also causing a flexuosity on the posterior margin; an obscure groove anteriorly bounds a lunular area, and there are several faint indications of other radii near those above mentioned; surface of the valves microscopically granulous, covered with a mostly dehiscent pale straw-colored epidermis; valves only moderately inflated; ligament long, black, deep-seated; hinge edentulous; interior of shell faintly radiately striate; scars distinct, with rather irregular outlines; margin sharp, simple; maximum longitude of shell 25; altitude 21.5; diameter 14.4; vertical from the umbones behind the anterior end 7^{mm}.

HAB.—Station 2779, in the Straits of Magellan, in 77½ fathoms, ooze, temperature 46°.9 F.

This splendid species is one of the largest recent forms known, and was discovered in fragments which admitted of reconstruction.

There does not appear to be any fossil species on the coast of South America which is nearly related to *C. fuegiensis*, but it may be mentioned that the *Venus bisectus* Conrad (Wilkes Exploring Expedition, Dana Geological Report, p. 724, pl. 17, fig. 10), afterward referred by Conrad to *Cyprina* (Am. Jour. Conch., 1, p. 153, 1865) is a fine species of *Cryptodon* or *Axinus*. I hope before long to publish a revised list of these Oregonian fossils referred by Conrad to the Eocene, some of which appear to be closely related to some of those forms figured from the Tertiary of Chile by the venerable Dr. Philippi in his latest works.

Cryptodon pyriformis Dall.

Plate XIV, Fig. 1.

Cryptodon pyriformis Dall, Bull. Mus. Comp. Zoöl., XII, p. 267, 1886.

HAB.—U. S. Fish Commission Stations 2646 and 2678, off the eastern coast of the United States, from Cape Fear to Florida, in 85 to 731 fathoms; also by the *Blake* in 640 fathoms in Yucatan Strait.

Cryptodon ovoideus Dall.

Plate XIV, Fig. 3.

Cryptodon ovoideus Dall, Bull. U. S. Nat. Mus., No. 37, p. 50, No. 211, 1889.

HAB.—U. S. Fish Commission Station 2626, in 353 fathoms, sand, 87 miles off Cape Fear, North Carolina, temperature 40° F.

The shell is yellowish-white and somewhat earthy, and measures 25 by 20^{mm}, with a diameter of 14^{mm}. The surface is somewhat malleated and the lunule short, wide and deep.

Family LUCINIDÆ.

Genus LUCINA Bruguière.

Lucina sombrerensis Dall.

Plate XIV, Fig. 13.

Lucina sombrerensis Dall, Bull. Mus. Comp. Zoöl., XII, p. 264, 1886.

HAB.—Stations 2646 and 2648, in 84 to 85 fathoms, sand and mud, off Cape Florida. Also in the Gulf of Mexico and off Sombrero Island, West Indies, by the *Blake*, in 50 to 72 fathoms.

Lucina leucocyma Dall.

Plate XIV, Figs. 6, 7.

Lucina leucocyma Dall, Bull. Mus. Comp. Zoöl., XII, p. 264, 1886.

HAB.—Off the eastern coast of the United States, the Gulf of Mexico and the West Indies, in from 5 to 683 fathoms. Collected by the *Albatross* at Stations 2117, 2595, 2596, 2600, 2602, 2646, and 2648.

Lucina sagrinata Dall.

Plate XIV, Fig. 11.

Lucina sagrinata Dall, Bull. Mus. Comp. Zoöl., XII, p. 265, 1886; XVIII, p. 439, 1889.

HAB.—U. S. Fish Commission Station 2646, off Cape Florida, in 85 fathoms; also in the Gulf of Mexico by the *Blake* in 182 to 300 fathoms.

Lucina pecten Lamarck.

Lucina squamosa Lamarck.

Lucina costata Tuomey & Holmes.

Lucina trisulcata Conrad.

The above-mentioned species of *Lucina* were obtained at Station 2758, 90 miles southeast from Cape San Roque, Brazil, in 20 fathoms, shelly bottom. *L. pecten* was also collected at the Abrolhos Islands, off the coast of Brazil, near Bahia.

Family DIPLODONTIDÆ.

Diplodonta soror C. B. Adams.

Diplodonta semiaspera Philippi.

The above species were collected at Station 2766, off the Rio de la Plata, in 10½ fathoms, sand.

Diplodonta subglobosa C. B. Adams.

This species was collected at Station 2758 with the species of *Lucina* above mentioned.

Suborder CHAMACEA.

Family CHAMIDÆ.

Genus **CHAMA** Bruguière.

Chama sarda Reeve.

This well-characterized species was collected at the Abrolhos Islands, Brazil.

Suborder CARDIACEA.

Family CARDIIDÆ.

Genus **CARDIUM** Linné.

Subgenus LOPHOCARDIUM Fischer.

Lophocardium Fischer, Man. de Conchyl, p. 1038, 1887. Type *C. Cumingi* Adams & Reeve.

Lophocardium Annettæ Dall.

Plate x, Fig. 4.

Lophocardium Annettæ Dall, Nautilus, p. 13, June, 1889.

Shell thin, inflated, subovate, longer than high; color rose red with a tinge of salmon-color; covered with a thin dehiscent papyraceous epidermis produced on the edges of the elevated sculpture; umbones inflated subcentral with the color deeper than on the rest of the shell; sculpture of fine very numerous radiating grooves with broader flat interspaces or flattened riblets, crossed by fine concentric, slightly irregular narrow ridges made more prominent by the slightly projecting epidermis; on the posterior sixth of the shell the radiating riblets are coarser and slightly rounded, crossed by rather distant more elevated concentric laminæ fringed with epidermis; the posterior area separated from the rest of the surface by a slightly elevated somewhat curved radial lamina which is minutely frilled or puckered in such a way that its edge where unbroken is delicately notched. Posteriorly the shell gapes a little; the anterior margin is evenly rounded, below evenly arched, posteriorly subtruncate and everywhere simple and sharp; the cardinal margin is reflected and elevated before the umbo, more depressed behind it with a delicate ligamentary insertion plate; there are no lateral teeth in either valve; in the right valve the inner edge of the hinge-plate is continued as an elevated line above which the upper posterior margin is produced vertically, making this valve a trifle larger than the other, and more angular at the upper end of the truncation; in the right valve are two slender curved cardinal teeth, the longer notched near its tip, in the left valve a single tooth excavated above. Longitude of shell 29; altitude 25; maximum diameter 20^{mm}.

HAB.—Coast of Lower California at Station 2828 in north latitude 24° 11′ and west longitude 109° 55′ in 10 fathoms; fragments were collected at Stations 2823 and 2826, in 8 to 27 fathoms, shelly bottom, within a few miles of the preceding and also in material dredged near San Clemente Island in 25 fathoms.

The soft parts of this species resemble those of other Cardiums, except that the siphonal septum is produced forward to and around the foot, completely separating the anal and branchial chambers. This septum is thin, membranous, and imperforate except for the foot. The siphonal orifices are profusely papillose and most of the soft parts are of a pinkish color.

This shell differs from all other Cardiums, recent or fossil (except *C. Cumingi*), in the total absence of lateral teeth The section *Lophocardium* of Fischer was based on the prominent radial lamina of *C. Cumingi*, but an examination made at the British Museum by the courtesy of Mr. E. A. Smith, at my request, showed that that species partakes of the same hinge characters. For this reason I raised the section to the rank of a subgenus under Dr. Fischer's name.

From *C. Cumingi*, which was obtained from the same region, the present species differs in form, in details of sculpture, and in the less elevated radial lamina. It is one of the most beautiful shells of the genus, but so fragile that it is extraordinary that even a single specimen was obtained in a perfect state.

The soft parts resemble in the main those of other Cardiums except in regard to the siphonal septum. A partial siphonal septum is common among Pelecypods, especially short-siphoned forms, where the internal septum may, to a certain extent, make up for the absence of the long and complete division between the passages in those forms with long siphons. The septum is usually a mere subtriangular thin membranous shelf, the posterior extension of the tissues which separate the two siphons, while from near its lateral corners radiate the muscles which in those forms with a pallial sinus serve to retract the siphons. Below it is the more fleshy languette or curtain-valve which closes the incurrent siphonal opening when required. Among those forms in which we may find the septum especially well developed are the different groups of *Cardium*. In *C. edule* a short septum is present, and is figured by Deshayes (Moll. Algerie, Pl. XCVII., Fig. 6), in which an opening appears above and behind the valvular languette. I suspect this to be due to lesion, as I have not found such an opening in any of the species of *Cardium* I have examined. In another species, *C. hians* (*op. cit.*, Pl. XCVI., Fig. 2), the septum is considerably extended forward. The present species has the ordinary gills of *Cardium* well developed, with their posterior anchorage high up and near the siphonal septum at its origin. The septum thin, slightly fibrous, but nowhere fleshy, extends forward to the foot and on each side of it. In this case there is no orifice above the languette, or elsewhere in the partition. Doubtless an exhaustive search would find many other groups in which certain members exhibit a siphonal septum, more or less completely dividing the peripedal chamber. Until the character has become more particularly specialized and permanently established, it is evident it can have but a minor value as a guide to the systematist, or a test of his classification.

Suborder ISOCARDIACEA?

Family ISOCARDIIDÆ.

Genus CALLOCARDIA A. Adams.

Callocardia A. Adams, Ann. Mag. Nat. Hist., XIII, p. 307, 1864. Dall Bull. Mus. Comp. Zoöl., XII, p. 272, 1886. Type *C. guttata* A. Adams.

To the kindness of Mr. Edgar A. Smith, of the British Museum, I owe a careful drawing of the interior and hinge of the unique left valve of Adams' type of *Callocardia*. This is reproduced here, having never been figured. *Meiocardia* H. & A. Adams differs from *Callocardia* not only in the shape of the shell but in the form of the cardinals, the principal lamella of which is externally carinated, the carina running down and outward below and coiling into the spiral umbo. The teeth in the whole of this family are peculiar, they seem appressed against rather than to rise from the cardinal margin and are separated by deep sockets or pointed holes; the teeth themselves seem to be composed of one or two lamellæ, springing from the umbonal hollow and terminating fan-like in several scallops or subsidiary flat denticles. The groups related to this genus are as follows:

PALLIAL LINE SIMPLE.

Kelliella (*miliaris*) Sars. Teeth well figured by G. O. Sars. Size small; teeth small, short, angular, ligament largely internal.

Vesicomya (*atlantica*) Dall. Size variable to large, teeth lamelliform, long, very flat, the middle one hardly curved, hardly separable from the thin long posterior lamella, deeply severed from the anterior and largest lamella; ligament wholly external.

Callocardia s. s. (*C. guttata*) Adams. Cardinal teeth arched in the left valve, short; ligament in a deep groove, chiefly external; posterior lamella separate, thin, rather long.

PALLIAL LINE DEEPLY SINUATED.

Callogonia (*Leeana*) Dall. Anterior cardinal and middle lamella continuous, angularly bent like a flattened M; posterior lamella short, high, separate; ligament inset but wholly external. Right valve with middle tooth strong deeply angulated, posterior lamella absent or represented by a spur or point just below and behind the posterior limb of the middle tooth; above this a socket for the reception of the posterior lamella of the other valve. The anterior lamella thin, concave upward, its edge somewhat irregular, sometimes faintly notched.

It is almost impossible by words to describe comprehensively these curious lamellar teeth; the reader may, however, with the aid of the figures, understand fairly well how they are arranged. The teeth of *Kelliella* are less lamellar than those of the other groups, are shorter and more triangular. The genuine fry of *Isocardia cor*, with which Jeffreys confounded *Kelliella miliaris*, has much thinner, flatter, more parallel teeth, very like those of *Vesicomya*, plus a lateral tooth.

The group named by me *Veneriglossa* in 1886 (*Atopodonta* of Cossman, 1887) may belong here, and in that case would follow *Callogonia*, having a moderately sinuated pallial line.

The species known to belong to the groups above mentioned are as follows:

I. *Kelliella miliaris* Philippi (+*abyssicola* Sars).

II. *Vesicomya subquadrata* Jeffreys sp.; *V. atlantica*, *V. pacifica*, and *V. Adamsi* Smith; *V. pilula* and *V. venusta* Dall.

III. *Callocardia guttata* A. Adams, *C. albida* and *C. Smithii* Dall. The last was, before it was thoroughly studied, referred by me to *Vesicomya*.

IV. *Callogonia Leeana* Dall.

Subgenus CALLOCARDIA s. s.

Callocardia guttata A. Adams.

Plate x, Fig. 5.

Callocardia guttata A. Adams, Ann. Mag. Nat. Hist. XIII, p. 307, 1864.

The figure above referred to is reproduced for comparison from the drawing of the unique left valve in the British Museum, for which I am indebted to Edgar A. Smith, esq., assistant, British Museum, in charge of the collection of Mollusca. It was found near one of the Japanese islands, Quelpaart, in the Kurile chain, in 48 fathoms, and externally is smooth, white, lightly maculated with yellowish spots.

Callocardia albida sp. nov.

Shell small, inflated, white, with a very thin pale dehiscent epidermis; sculpture of rather coarse, somewhat irregular concentric lines and grooves, in harmony with the incremental lines; beaks high, stout, inflated; shell almost exactly the shape of *Cytherea albida;* lunule short, wide, marginated by a distinct groove; ligament short, wholly external; escutcheon none, or undefined by any ridge; anterior end rounded, posterior end slightly more pointed; interior white smooth, the muscular scars faint, the pallial line simple, indistinct; teeth in the left valve two; one representing the fused middle and anterior tooth is formed by the ventral margin of the hinge-plate projecting laterally in a squarish elongate lamina showing two short curves concave downward and meeting each other at a slight ridge, at the termination of which is a small indentation in the profile of the lamina; the other tooth is close to the dorsal side of the hinge-plate, wholly separated from the other lamina, than which it is lower and less curved; it lies directly under the ligament; altitude of shell 8; longitude 9; diameter 7^{mm}.

HAB.—U. S. Fish Commission Station 2762, in 59 fathoms, mud, east from Rio Janeiro; bottom temperature 57° F.

A single left valve was obtained. This species is quite near *C. Adamsi* from Sierra Leone, but has fuller and stouter beaks and a more elongated and *Cytherea*-like outline; the lunule is also smaller and proportionately broader; the teeth differ in small details, being stout and curved, not flat and low as in the typical *Vesicomya.*

Callocardia Smithii Dall.

Plate x, Figs. 1, 2, 3.

Callocardia (*Vesicomya*) *Smithii* Dall, Bull. Mus. Comp. Zoöl., XVIII, p. 439, June, 1889.

Shell pale straw color or yellowish white, glistening, sculptured with fine somewhat irregular, rounded concentric incremental ridges, hardly elevated above the general surface; valves full, evenly rounded below and behind, with a few, inconstant, extremely faint, radiating impressions behind the beaks which do not essentially modify the margin or the sculpture; beaks rather anterior, full, not bulbous; a feeble impressed line proceeding from them marks the boundary of the lunule; above and below this are two other slight flexures not concentrated into lines, of which the lower one coincides with an extremely faint wave on the margin; interior white, polished; muscular scars narrow, the pallial line simple with an extremely faint flexure just before it joins the posterior adductor scar; scar of the pedal muscle just above the anterior adductor, small, elongate-triangular, deep; margin smooth simple. Longitude of shell 28; altitude 22; diameter 15^{mm}.

HAB.—U. S. Fish Commission Station 2754, east of Tobago, in 880 fathoms, globigerina ooze; bottom temperature 37°.9 F.

A number of loose valves of this interesting species were obtained as above stated, but no specimens containing the soft parts.

On a cursory examination this species was referred to the *Vesicomya* section of the genus, but from a more thorough study it became evident that it was more nearly allied to the typical *Callocardia*. The ligament is delicate and though somewhat inset is wholly external. The anterior dental lamina in the right valve has an elevated equilateral triangular point; the upper lamina is also triangular, but has a short anterior side and a long gradual posterior slope, the edge of which is slightly undulated and grooved above, so that, while really continuous with the posterior lamina which is slightly thicker, a vertical view as in Fig. 2 gives the impression of two teeth. The anterior lamina is the largest. Close to the outer margin of the ligamentary furrow is a well marked ridge which forms the boundary of the escutcheon, but is hardly visible in a profile view of the shell.

Subgenus CALLOGONIA Dall.

Pallial line with a deep narrow sinus.

Callogonia Leeana Dall.

Plate x, Figs. 6, 7, 8, 9.

Callocardia (*Callogonia*) *Leeana* Dall, Bull. Mus. Comp. Zoöl., XVIII, p. 440, June, 1889.

Shell narrow, elongated, slightly compressed, white, with a pale yellowish epidermis and a sculpture of faintly elevated fine concentric lines coincident with the lines of growth; umbones not prominent; anterior end rounded; posterior end moderately, obliquely subtruncate rounded off above, slightly pointed below; there is no line circumscribing a lunular space, and the ridge, if any, bordering the ligament is so fused with the margin of the ligamentary groove that the shell may be said to have no escutcheon; there are a few irregular extremely faint radiating lines, and a rounded ridge hardly defined extends from the beaks to the lower posterior angle. Internally the shell is smooth, white; the adductor scars larger proportionally and rounder than in *C. Smithii*, the pedal scar deep but relatively smaller; the pallial line is broad, with a deep angular sinus; the margin simple, smooth; in the right valve the anterior lamina is longest and is concave upward with a rounded profile; the middle lamina is strongly bent with the angle upward and is higher than the others; to it is attached the short thin posterior lamina which is the lowest of the three with a sort of socket above for the corresponding lamina of the other valve; the posterior lamina is strengthened by a buttress from the ventral edge of the hinge; below the middle lamina is a deep pit; another pit is found above the anterior lamina; the ligamental groove is well marked. In the left valve the middle tooth is thick and bent but with no pit below it; a deep notch separates it from the anterior lamina; behind or above these two is a deep irregular groove; the posterior lamina is independent, straight, short, with a deep groove between it and the surface to which the ligament is attached. The altitude of a young but perfect specimen is 20; the length 28; and the diameter 12^{mm}. Fragments show that the species attains nearly twice this size.

HAB.—U. S. Fish Commission Station 2754, east of Tobago, in 880 fathoms, globigerina ooze; bottom temperature 37°.9 F.

Figures 8 and 9 show the hinge of a well-grown specimen. A view from below of the hinge of the right valve, from a fragment of a still larger specimen, shown by Fig. 7, will assist in making clear the complicated mechanism of the hinge.

This species, compared with the typical *Callocardia*, shows how short is the interval which in some cases separates species with a deep pallial sinus from species with none; another instance is the relation of *Veneriglossa* Dall (*Atopodonta* Cossman) with *Cytherea*. It is probable that neither of the *Callocardiæ* have long siphons, though one has retractor muscles and the other none, or none to speak of. These characters are like the branchiæ, essentially adaptive and relatively superficial, and can no longer be regarded as of high systematic importance, except when correlated with other more fundamental features.

It is rather curious that a close inspection shows that the cardinal teeth of a young *Isocardia cor.* L. are more like those of *Vesicomya* than like those of *Kelliella miliaris*, with which Jeffreys confounded the young of the first mentioned species, to say nothing of *Kelliella* having not the slightest trace of a lateral tooth.

This species is named in honor of Prof. L. A. Lee, in charge of the scientific work on the *Albatross*.

VENERIGLOSSA Dall.

Veneriglossa (subgenus of *Cytherea*) Dall, Bull. Mus. Comp. Zoöl., XII, p. 275, 1886.
Atopodonta Cossman, Mem. Soc. Roy. Mal. Belg., XXI, p. 110, 1887.

Veneriglossa vesica Dall.

Plate XIV, Figs. 8, 12.

Cytherea (*Veneriglossa*) *vesica* Dall, *op. cit.*, p. 275, XVIII, p. 440, 1889.

HAB.—Gulf of Mexico and West Indies, in 81 to 100 fathoms. This problematical shell is figured here for comparison with the preceding species of *Isocardiacea*.

Suborder VENERACEA.

Family VENERIDÆ.

Genus **VENUS** Linné.

Subgenus CHIONE Muhlfeldt.

Chione cancellata Linné.

This well known species, which ranges north to Cape Hatteras, was collected at Port Castries, Santa Lucia Island, West Indies; at Station 2758, 90 miles southeast from Cape San Roque, Brazil, in 20 fathoms, shelly bottom; and at the Abrolhos Islands, off the coast of Brazil, near Bahia.

Chione rugosa Gmelin.

This species, which is known from Hatteras south to Rio Janeiro and on both coasts of Central America, was obtained at Station 2758.

Subgenus ANAITIS Römer.

Anaitis varicosa Sowerby (1853).

This species, which is abundant off Hatteras and fossil in several of our tertiary strata (under various names), was collected at Station 2758. It is very close to if not identical with *Venus alveata* Conrad, 1831.

Genus **CYTHEREA** Lamarck.

Cytherea hebræa Lamarck.

Young specimens of this species were obtained at Station 2758.

Cytherea euçymata, sp. nov.

Plate XIII, Fig. 11.

Cytherea sp. (No. 290) Dall, Bull. U. S. Nat. Mus., No. 37, pp. 56, 57, August, 1889.

Shell thin, inflated, concentrically ribbed, waxen white or pale brown, with clouds and zigzag fluctuations of madder brown, polished; adult with about fifty rounded slightly flattened concentric waves with a short dorsal and long ventral slope, separated by narrow sharp grooves; these waves become fused in pairs or alternately obsolete and raised into more thin and elevated lamellæ near the posterior dorsal margin; radiating sculpture none, except a narrow ridge bordering the ligamental furrow and the groove which circumscribes the lanceolate lunule; there is no escutcheon; margin elegantly rounded, a little straighter along the ligamental border, outline ovate; beaks full, not prominent; hinge of the genus; the lateral tooth conic in the young, compressed in the adult; margin rounded, smooth; pallial sinus not quite reaching the vertical from the beaks, rounded or subtruncate at its inner part. Adult, maximum longitude 40, altitude 32, diameter 26, vertical from the beaks behind the anterior end 10; young, maximum longitude 14.5, altitude 11.5, diameter 7.5, vertical 4.5^{mm}.

HAB.—Station 2402, between the Mississippi delta and Cedar Keys, in 111 fathoms, muddy bottom; stations 2604 and 2606, off Cape Hatteras, North Carolina, in 25 to 34 fathoms, sand; west of Florida, in 50 fathoms (U. S. S. *Bache*); station 2640 and 2646, off the southern part of Florida, in 56 to 85 fathoms, sand; and station 2758, 90 miles southeast from Cape San Roque, Brazil, in 20 fathoms, shelly bottom; temperatures 77° to 79°.1 F.

This remarkably elegant species has about the form of *Dione Kingi* Gray as figured by Reeve (Conch. Icon. *Dione*, Pl. IX, Fig. 36*a*) with somewhat the sculpture of *D. grata* and *D. erycina*. It recalls in its coloration *Tapes turgida* Lamarck and *T. lirata* Philippi, minus their dark radiating bands. It is like none other on the east coast of America and has been for several years recognized by me as undescribed, from the specimens in the National Collection.

Subgenus CALLISTA (Poli) Mörch.

Callista maculata Linné.

This species was collected at Station 2758.

Suborder TELLINACEA.

Family TELLINIDÆ.

Genus **MACOMA** Leach.

Subgenus CYMATOICA Dall.

Shell telliniform, without lateral teeth, with two small grooved cardinal teeth in the right valve, one in the left valve, and no laterals; with the external surface covered with wavy sculpture not in harmony with the direction of the incremental lines; with the anterior portion of the shell longest, the posterior strongly flexed, and with the pallial sinus deep but free from the anterior adductor scar in both valves.

Cymatoica occidentalis sp. nov.

Plate X, Fig. 11.

Shell small, thin, white, moderately full in front, compressed and strongly twisted to the right, behind; anterior part of the shell the longer, sloping from the beaks, gently rounded toward the base; beaks small, pointed, not inflated; posterior portion of the valves rapidly attenuated, compressed, rostrated and somewhat obliquely truncated; sculpture of small, narrow, rounded, nearly equidistant waves, not in harmony with the incremental lines and showing in different specimens slight differences of prominence and direction; in general they have a longitudinal direction, rising as they pass backward; those near the margin are sometimes broken up into short segments, and on the opposite valves of the same specimen there are usually perceptible but not constant differences in the sculpture, which is fully reflected on the polished interior of the delicate valves; ligament thin, short; lunular area long, very narrow, smoother than the rest; rostrum transversely striated with two or three obscure radial ridges, the most anterior of which forms the boundary behind which the waved sculpture does not pass; interior polished, scars of adductors obscure; pallial sinus deep, rounded, reaching to or into the anterior third of the shell; teeth small, short, simple in the young, grooved on their outer surface in the adult, the single tooth in the left valve showing the grooving most strongly. Maximum longitude of shell, 12.5; altitude, 6; diameter, 3^{mm}.

HAB.—U. S. Fish Commission Station 2823, in latitude 24° 18′ N., longitude 110° 22′ W., off the coast of Lower California, in 26½ fathoms, fine sandy mud.

This interesting little shell gapes, if at all, but slightly and only at the tip of the rostrum.

Cymatoica orientalis sp. nov.

Plate x, Fig. 12.

Shell white, thin, resembling the last species, but with the beaks more central and less pointed, the posterior end broader at the more vertical truncation and less rostrate, the valves slightly flatter and the wavy sculpture distinctly angulated at an oblique line radiating from the beaks somewhat forward; there are no visible radii on the rostrum, but the wavy sculpture does not pass forward of a diagonal from the beak to the lower posterior angle of the shell; the lunular area is wider and more deeply impressed than in *C. occidentalis*, and the posterior end of the shell is less strongly flexed. Maximum longitude, 9.5; altitude, 5.5; diameter, 3^{mm}.

HAB.—Samana Bay, Santo Domingo, in 16 fathoms, mud, Couthouy; also in the same depth at Cardenas, Cuba, from T. H. Aldrich, esq.

This little shell has been many years in my hands awaiting a name. When an analogous species appeared in the Fish Commission collections from the Pacific it seemed a suitable occasion to put them on record together. The wavy sculpture in this species is sometimes a good deal broken up anteriorly.

Subgenus MACOMA s. s.

Macoma brevifrons Say.

Tellina brevifrons Say, Am. Conch., VII, Pl. 64, Fig. 1, 1834.

The shell, which I have identified as the true *brevifrons* of Say, though with some hesitation, agrees well, when young, with Mr. Say's description and passably well with his figure. The latter is usually on the plate colored so that it does not agree with the text, which was published after Mr. Say's death. The adult shell is proportionally longer than the above-mentioned figure, and is characterized by a suffusion of dull rufous or orange color in the interior and toward the beaks, the tips of which, however, are usually paler. Stimpson, from a comparison with Say's specimens, named the specimens found by him in Charleston Harbor *T. brevifrons*, and I have followed him.

The shell is rare in South Carolina, extends to Florida and Texas, is reported from the West Indies in several localities, and has been erroneously identified with *T. candeana* Orbigny.

Its southward range is now extended by the U. S. Fish Commission to Station 2764, in 11½ fathoms, off the Rio de la Plata, in south latitude 36° 42′ and west longitude 56° 23′, on a sandy bottom.

Family SEMELIDÆ.

Genus **ABRA** Leach.

Abra longicallus Scacchi.

This well-known abyssal shell was collected at Station 2751, south of St. Kitts, in 687 fathoms, ooze; Station 2754, east from Tobago, in 880 fathoms, ooze; and Station 2760, 90 miles north from Ceara, Brazil, in 1,019 fathoms; temperatures 37°.9 to 39°.9 F.

Genus **ERVILIA** Turton.

Ervilia concentrica Gould.

This species was collected at Station 2758, 90 miles southeast from Cape San Roque, Brazil, in 20 fathoms, shelly bottom.

Genus **SEMELE** Schumacher.

Semele reticulata Gmelin.

This species was collected at Station 2758; at Stations 2765 and 2766, off the Rio de la Plata, in 10½ fathoms, sand; and at the Abrolhos Islands, off the Brazilian coast, near Porto Allegre. It ranges northward to Virginia and the Bermudas.

Semele cancellata Orbigny.

This very characteristic species was collected at Station 2758, which greatly enlarges its known southward range. Its northern limit as far as known is the vicinity of Cape Hatteras, North Carolina.

Semele nuculoides Conrad.

Plate XIV, Fig. 5.

Semele nuculoides Dall, Bull. U. S. Nat. Mus., No. 37, p. 62; No. 371, August, 1889.
? *Amphidesma nuculoides* Conrad, Am. Journ. Sci., XLI, p. 347; Miocene Foss., p. 73, Pl. 41, Fig. 6.

HAB.—Stations 2597, 2602, 2607, 2608, 2610, 2611, 2612, 2615, 2617, 2619, 2622, and south to the West Indies, in 2 to 124 fathoms, extending north to Cape Hatteras.

This curious little shell is probably the same as Conrad's Miocene fossil; at all events it is fossil in the Miocene. I have received it under the name of *Montacuta lirulata* Carpenter, from the West Indies. It is yellowish, sometimes radiated with red, closely concentrically waved and quite compressed. It differs from most species of *Semele* in its small size and erect beaks, but in nothing else so far as the shell is concerned. *Semele cancellata*, both in size and attitude of the umbones, forms a transition from this little member of the group to the ordinary type.

Order ANOMALODESMACEA.

Suborder ANATINACEA.

Family ANATINIDÆ.

Genus **ASTHENOTHÆRUS** Carpenter.

Subgenus BUSHIA Dall.

Bushia (elegans var?) Panamensis Dall.

Shell resembling *B. elegans* in all respects except that the single valve collected is proportionately higher, the umbo more central, the anterior end more evenly rounded and the posterior end shorter and more vertically truncate. Maximum longitude of (right) valve 14; altitude 11.3; (semi) diameter 4; vertical of beaks behind anterior end, 8^{mm}.

HAB.—Station 2805, in 51 fathoms, mud, in Panama Bay.

It is very interesting to find *Bushia* on the west coast as *Asthenothærus* was found in Florida, each having first been described from the opposite shore of the continent.

Genus **THRACIA** Blainville.

Thracia distorta Montagu.

Thracia distorta Montagu, Dall, Bull. Mus. Comp. Zoöl., XII, p. 307, 1886; List of Marine Mollusks, U. S. Nat. Mus. Bull., 37, p. 64, No. 383, 1889.

This species has already been reported from Honduras as well as European seas, and was collected by the *Albatross* at Station 2764, in 11½ fathoms, sand, off the Rio de la Plata.

Thracia Stimpsoni Dall.

Plate XIII, Fig. 2.

Thracia Stimpsoni Dall, Bull. Mus. Comp. Zoöl., XII, p. 307, 1886.

This fine species was collected by the *Albatross* in 28 fathoms in the Gulf of Mexico, on the line between Tampa and the Dry Tortugas, at U. S. Fish Commission Station No. 2410. Its nearest relative is *T. convexa* Wood, from which it differs in proportions and sculpture. With the exception of the northern *T. Conradi*, it is the largest American species.

Family LYONSIIDÆ. ?

Genus **LYONSIELLA** Sars.

Lyonsiella radiata Dall.

Plate VIII, Fig. 7.

Lyonsiella radiata Dall, Bull. Mus. Comp. Zoöl., XVIII, p. 442, June, 1889.

Shell large, thin, pearly, recalling *L. gemma* Verrill (=*insculpta* Jeffr. + *ecostata* Seguenza), but very much larger, higher, less rounded anteriorly, less pointed behind, and more produced and rounded ventrally; hinge simple, undulated, with a rather large, arched ossicle; exterior whitish, with a thin olivaceous epidermis raised over five ribs into rather high distant radiating ridges, to which mud adheres tenaciously; incremental lines distinct, silky, sometimes prominent; lunule in the right valve impressed, produced laterally, not marginated; interior pearly, with faint radiating sulci, corresponding to the external ridges; maximum altitude of shell, 13; longitude, 11; diameter, 8.5^{mm}.

HAB.—In Magellan Straits, at U. S. Fish Commission Station 2780, in 369 fathoms, mud; and at Station 2785, off the west coast of Patagonia, south latitude 48° 9′, in 449 fathoms, mud; temperatures 46°.9 F. in both cases.

There are a large number of acephalous mollusks, not necessarily nearly related, in which a true branchial septum exists. In a young *Perna*, supposed to be *P. ephippium* L., the inner edges of the ctenidia are united to each other their whole length behind the foot. The outer edges are attached to the mantle, or visceral epiderm, so as to form a complete chamber, like that of *Cuspidaria*, but of which the derivation is radically different. In *Modiolarca trapesina* Lam., from Cape Horn, the ctenidia, from below the anal siphonal orifice to and around the foot, are united as in *Perna*. The chamber thus constituted is crammed with the young fry at the proper season. In *Lyonsia beana* Orb. the united ctenidia are attached above the rudimentary siphonal septum, extend forward to and around the foot. They are attached to each other and to the mantle, or to the ventral surface of the visceral mass, by their edges and form a most complete chamber, a true ctenidial septum. There are, however, no orifices in this or in any of the species with a strictly ctenidial septum corresponding to the septal perforations in *Poromya* or *Cuspidaria*.

In *Lyonsia radiata* we have a similar state of affairs, except that the anterior inner edges of the gill are not so closely united around the foot. The part played by the siphonal septum in this species is insignificant; it is in fact hardly perceptible. The infolding of the mantle edge around the siphon is very wide; its outer edge is nearly plain. Within this edge a short distance is an elevated ridge, with a single row of small, rounded, ocellus-like tubercles on each side of it. A wide space separates this range of processes from the margin of the branchial orifice, which is profusely papillose with arborescent papillæ. A lunate depression lies between this and the much smaller, plain-edged, nearly linear anal orifice, while in front of it the pedal opening forms a minute narrow slit, with granulated margin. In this form the palps are represented by a slightly raised edge around the mouth, not produced or elongated at the sides. A languette or curtain valve hangs behind the branchial orifice below the narrow septum.

The balance of characters will perhaps carry *Mytilimeria* and *Lyonsiella* to the *Anatinidæ*, or a family by themselves, rather than to the *Verticordiidæ*, where I first placed them. But they are transitional in their relations, and in spite of the relations between the form of the gills in *Lyonsiella* and *Lyonsia*, I am still inclined to think the former almost equally close to *Verticordia*. A supposed discrepancy, noted by Pelseneer, arises from the fact that, instead of comparing *Lyonsiella* with a genuine *Verticordia*, like *acuticostata*, as I did, he compares it with a species of *Poromya*, which is, of course, a very different thing.

Family VERTICORDIIDÆ.

Genus **VERTICORDIA** Wood.

Verticordia (Wood) Dall, Mus. Comp. Zoöl. Bull., vol. XII, p. 285, 1886.

Verticordia acuticostata Philippi.

V. acuticostata Dall, *op. cit.*, pp. 285, 288.

HAB.—Cuba, Barbados, and Gulf of Mexico, *Blake* expedition; Mediterranean, Philippi; North Atlantic, Jeffreys; Japan, A. Adams. U. S. Fish Commission Stations 2659, off Cape Canaveral, in 509 fathoms, bottom temperature 45°.2; and 2750, off St. Bartholomew, West Indies, in 496 fathoms, sand, temperature 44°.4.

This species grows to a considerable size, the two Fish Commission stations affording valves 19 and 20.5^{mm} in height respectively.

Soft parts.—Another specimen, and a re-examination of the one reported on in 1886, confirm the description then given. There are no palpi, the anterior pair are wholly unrepresented, the posterior or lower pair may be represented by two small rounded hardly elevated tubercles between the mouth and the anterior ends of the gills. The foot is relatively extremely large, round, and stopper-like. The gills in the second specimen are clearly adnate, as in Pelseneer's figure of *Lyonsiella papyracea* Smith (Chall. Rep. Anat. Moll., Pl. III. Fig. 1), except that they are underlaid by the solid fleshy siphonal septum, and do not serve to supplement that septum as they are alleged to do in *Lyonsiella abyssicola.* They are proportionately very much smaller, hardly reaching behind the middle of the foot. I suspect that the free end of the gill in my first specimen was separated by a lesion, and is not normal, but that the gill is always adnate in the adult condition.

The septum is thick and fleshy, quite destitute of perforations or orifices except that in which the foot stands.

Verticordia (Trigonulina) ornata Orbigny.

This species, already known from widely separated regions, was collected 90 miles southeast of Cape San Roque, in 20 fathoms, at U. S. Fish Commission Station 2758.

Verticordia perplicata sp. nov.

Plate VIII, Fig. 1.

Shell large, strongly plicated radially, with the hinge of *Verticordia* (restricted) and a coarsely granulous finely wrinkled external surface of a dark brown color; anterior surface with two or three strong and several smaller obscure radiating ribs which undulate the margin; behind these is the strongest broad rib with a rounded top followed by a wide sulcus, then by two somewhat smaller and one still narrower rib with increasingly narrower interspaces; then a wider, stronger, and shorter rib, a deeper sulcus, and lastly by the rounded posterior area; with these principal radii are traces of much finer ones, differing in different individuals, while the eight primary radii seem pretty constant in position and relative size; lunule very small and deeply impressed; behind it in the right valve is a single strong conical or slightly excavated tooth, convex below and short; immediately in front of the beaks the hinge line is narrow with a narrow groove for the cartilage and a short, wide, subtriangular ligamentary basis; beaks small, incurved; underneath and a little in front of the cardinal tooth is a small, deep, muscular scar; anterior adductor scar large, not deep; posterior ditto even less impressed; margins of the valves thin, undulated by the sculpture, not crenulated; interior pearly white, grooved in harmony with the external sculpture; maximum longitude of shell, 33; maximum altitude, 35; diameter, (about) 28^{mm}.

HAB.—U. S. Fish Commission Station 2807, in 812 fathoms, mud, near the Galapagos Islands; bottom temperature 38°.4 F.

Two nearly complete right valves, fragments of several others, and fragments of two left valves were collected as above stated. When perfect this must be one of the finest species of the genus. The surface is very finely, irregularly wrinkled, with an abundant supply of rather minute pustules, rounded in the specimens but perhaps more pointed in the perfect shell. A more minute description of the hinge must await material in better condition; the data now given are quite sufficient to identify the species.

Family CUSPIDARIIDÆ.

Genus **CUSPIDARIA** Nardo.

Cuspidaria Nardo, Revue zoöl., p. 30, Jan., 1840.
Neæra Gray (1834), not of Robineau Desvoidy (1830).
Cuspidaria Dall, Bull. Mus. Comp. Zoöl., XII, p. 292, Sept., 1886.

Cuspidaria patagonica Smith.

Neæra patagonica Smith, Challenger Lamellibranchs p. 39, Pl. VII, Figs. 5, 5*a*–*b*, 1885.

HAB.—U. S. Fish Commission Station 2751, in 687 fathoms, ooze, off St. Kitts, West Indies, temperature 40° F. Station 2792, off Manta, Ecuador, in 401 fathoms, mud, temperature 43°, etc.

A fine specimen of this species, measuring 44^{mm} in length and 14^{mm} in transverse diameter, was dredged off Manta; other specimens were found in dredgings from the whole eastern coast of South America, the western coast of that continent, and northward as far as Lower California. The larger specimen afforded the following notes.

The siphonal septum, by which name I shall refer to the dividing septum of the peripedal chamber, extends forward from the proximal end of the siphons to the anterior adductor. It is divisible into three areas, a longitudinal central muscular area occupying about two-thirds of the whole septum, and on each side a less muscular, thin, and tense membranous strip, which is connected with the inside of the valves and leaves the imprint on the shell which would ordinarily be taken for the outline of the "pallial sinus." The central muscular area is attached by a bundle of muscular fibers above each adductor on each side of the median line. All four points of attachment leave well-marked scars on the shell. I have shown elsewhere that these muscles, if not homologous with, at least perform the functions of the siphonal retractors of ordinary Pelecypods, and in forms like *Poromya mactroides*, where the usual retractors are present, the siphonal septum is destitute of muscularity, or possesses it only to an inferior degree. The posterior septal muscles are smaller and rounder in section, more vertical in direction, and more widely separated from each other than the anterior pair. The latter are narrow and elongated on their surface of insertion, and but for the separation of the valves would nearly touch in the median line. The principal body of fibers on the plane of the septum is longitudinally arranged; another series crosses the septum in an arched manner toward its extremities, especially behind, while there are indications of still smaller series of more or less radiating fibers knitting the whole fabric together and to the shell.

The siphonal septum in this species divides the cavity of the shell unequally, the upper portion being smaller than the lower. In the upper, sustained especially by a median fibrous mesenteric band, is suspended the visceral sac. Viewed from above, it is subcordate in profile; from the side it seems acutely ovoid. It occupies, as contracted by alcohol, about half the cavity above the septum. The valve of the anal siphon is represented above the septum by a thin vertical wall of membrane pierced by a relatively small simple central orifice. The valve of the branchial siphon below the septum is composed of three rather thickish processes, one hanging vertically is short, wide, and represents the languette in *Cardium*; the lateral processes are somewhat longer and obliquely set, the whole forming a large subtriangular opening with three partially overlapping curtains. Passing backward on the ventral surface of the septum, aside from the streakiness due to the fibrous coarse muscular tissue, there is a distinct narrow median depression behind the foot, except just behind the edge of the foot, where the surface in all the forms with a muscular septum is elevated like a wave rising about a solitary rock. The foot is slender, elongated, slightly geniculate, with a small byssal groove behind. Immediately in front of it the surface is depressed about the small and inconspicuous mouth. Here the anterior palps are almost wanting, but the posterior, though abnormally small, are elevated above the surface and strongly transversely striate. In front of the palps is a strong ridge of tissue, behind the anterior commissure of the lobes of the mantle. Here a narrow horny or chitinous gusset strengthens the commissure, above which is a sort of pocket or shallow indentation, above which the external margin of the mantle finally joins. The gusset is narrow, concave in the middle, with its ends spatuliform and shows brown through the white tissues, like the jaw of a Gastropod.

If the surface of the septum near the foot be closely scrutinized there will be seen on each side four slight prominences. The anterior pair are on each side of the mouth, the second and third pairs by the sides of the foot, the fourth behind the foot, all situated in the thickest part of the muscular portion of the septum. The posterior pair have two lips, the others three to each prominence, and on gentle pressure with a fine probe it will be found that a small circular orifice passes somewhat obliquely through the septum and communicates with the upper chamber.

These passages are not always complete, however; for by means of careful sectionizing I found the third pair imperforate in a fairly grown specimen of *C. rostrata*, while in several young specimens the two posterior pairs seemed imperforate. In a specimen of *C. arctica* var. *glacialis* I found five orifices on each side, showing that the number is not invariable.

The lips to these orifices are not prominent, much less so, indeed, than in *Cetoconcha* or *Poromya*. The office of a gill must, therefore, as suggested in 1886, by me in the first part of my *Blake* report (p. 303), be performed by the surface of the septum or by the lobes of the mantle. This is a very different view from Dr. Pelseneer's idea that the septum is itself homologous with the ordinary gills of Pelecypods.

By cutting the lobes of the mantle away, and carefully turning back the septum as a whole, extracting the foot from its socket, we see the simple oblique upper ends of the septal orifices. What can their office be? I suppose that they serve to admit fresh water to the upper chamber, which I believe to be utilized in some, if not all, instances as a marsupium. It is probable that by suitable muscular contractions, the septum will operate somewhat like the washer of a pump valve, and that the upper chamber can be filled or emptied of its contained water at will.

I believe the septum in *Cuspidaria* to be homologous with the ordinary siphonal septum, only more prolonged; and that its muscular tissue is the equivalent of the siphonal retractors of ordinary Pelecypods. I do not regard it as in any manner homologous with the normal ctenidia.

Cuspidaria (?) monosteira sp. nov.

Plate VIII, Fig. 5.

Shell small, inflated, stout and strong, with a single strong vertical keel and much fainter concentric sculpture; color white, with a very thin, pale epidermis; umbones nearly central, anterior end evenly rounded from the beak to the basal end of the keel; posterior end rostrate, the rostrum short, wide, abruptly truncate; concentric sculpture of rather strong incremental lines, which at first are varied by regularly spaced, rather sharp, distant, elevated lines; later these become obscured in the stronger, more crowded, and rather irregular incremental lines; a faint ridge extends from the beak to the lower angle of the rostrum, the only other radial sculpture is the exaggerated, high, flat-topped, vertical keel; this projects from the rounded base and interrupts its curve; interior smooth, scars hardly perceptible; in the left valve the hinge-line is arched or rather angulated in the middle; there is a strong posterior lateral tooth, no anterior lateral or any cardinal teeth; the fossette is small, posteriorly inclined, and continuous with the margin of the hinge; maximum longitude of shell 5; altitude 4.25; diameter 5^{mm}.

HAB.—U. S. Fish Commission Station 2760, 90 miles north from Ceara, Brazil, in south latitude 12° 7′, west longitude 37° 17′, in 1019 fathoms, bottom temperature 39°.4′ F.

Only a left valve of this remarkable and very characterististic little shell was obtained. As the left valve is the uncharacteristic one as regards the hinge, it is not practicable to say to which section of the genus this species should be assigned, but its characters agree with those of the left valve of *Neœra pulchella* H. Adams.

Cuspidaria (Cardiomya) striata Jeffreys.

This species which ranges northward to the Arctic Seas and whose southernmost known range was Florida Strait, was collected east from Rio Janeiro, at Station 2762, in 59 fathoms, muddy bottom. This gives an immense extension of its southward range.

Subgenus LUZONIA Dall & Smith.

Both valves without lateral teeth, right valve with an anterior cardinal tooth, left valve edentulous; exterior concentrically striate; fossette narrow, parallel with the cardinal margin under the apex. Type *Neæra philippinensis* Hinds, from Luzon and Mindanao, Philippine Islands.

This is Section H of Smith's arrangement of 1885, in the Report on the *Challenger* Lamellibranchs, p. 37.

Cuspidaria (Luzonia) chilensis sp. nov.

Plate XIII, Fig. 13.

Shell white, thin, polished, under a rusty brown, dull, caducous epidermis; beaks not prominent, nearly central; anterior hinge-margin thin, sloping evenly and then evenly rounded to the arcuate base; posterior hinge-margin declining somewhat less, nearly straight, at the end of the rostrum evenly rounded over, the end of the rostrum being rounded, not truncate. On the rostrum is an obscure ridge extending to the umbo; in front of this ridge is a wide shallow sulcus by which the basal margin at the beginning of the rostrum is rendered a little concave; there is a faint ridge or thread close to the posterior hinge margin in the left valve, but none in the right; sculpture of fine silky concentric lines, but no radii; interior polished, with a few fine radiating striæ; pallial line simple, not sinuated, vertically truncate at the beginning of the rostrum; hinge margin thin, edentulous except for a small triangular lamina in the right valve in front of the fossette; fossette narrow, directed backward, parallel with the hinge margin; ligament thin, stout, brown, re-enforced below with a narrow elongate-triangular ossiculum; maximum longitude, 11; altitude, 8; diameter, 6.6; vertical of beaks behind the anterior end, 6^{mm}.

HAB.—Station 2791, off the southwest coast of Chili, in 677 fathoms, mud; temperature 37°.9 F.

This species has the mantle margin simple, the siphons extremely short, retracted by the septal muscles; the ova project into the anal chamber from the surface of the visceral mass in rounded lobules, much as in *Myonera*; a number of the dehiscent ova were retained in the anal chamber. There were four septal orifices on each side; their apertures simple, oval and oblique; the septum was rather muscular, but not solidly so as in *Cuspidaria*; its surface was heaped up in sundry wave-like prominences behind and on each side of the foot. The palpi were extremely small, the lower ones nearly absent; the foot was short, stout, and subconical; the anal chamber quite small.

Genus **MYONERA** Dall.

Myonera paucistriata Dall.

Plate XIII, Fig 12.

Myonera paucistriata Dall, Bull. Mus. Comp. Zoöl., XII, p. 302, 1886.
Neæra paucistriata Dall, Bush, Trans. Conn. Acad., VII, p. 473, 1885.

HAB.—Florida Keys and Windward Islands, in 339 to 464 fathoms, bottom temperature 41°.5 to 45° F. U. S. Fish Commission Stations 2644, 2678, 2751, and 2754, ranging from Cape Fear, North Carolina, to Tobago, in 193 to 880 fathoms, temperatures 27°.9 to 43°.4 F.

To the description already published of the soft parts of this extremely fragile and delicate form several points can be added from the examination of the fresh specimen. The only correction to the original description relates to the opening of the anal siphon, which is a minute circular orifice in a delicate membranous area which in life probably projects in a dome-like manner, but in alcohol appears tense and flat. The opening is into the upper portion of the peripedal chamber, of course, as in the other species. That which I took for the anal opening in the first specimen examined was an accidental lesion, while the true anal opening from its minuteness was overlooked.

The mouth, as stated in 1886, is a simple opening without palpi. The latter are represented, if at all, by a delicate slightly elevated ring of tissue which surrounds the circular mouth. The absence of gill laminæ is fully confirmed. The septal orifices on the ventral surface are hardly observable without the closest scrutiny, though easily visible on the dorsal surface of the septum. There are eight, as in the *Cuspidaria patagonica*, and their lips slightly elevated, usually appear triple, so as to give a triangular aspect to their junction. When sounded by a delicate probe they appear subtubular.

The muscular tissue of the septum is concentrated in two bunches of coarse fiber-bundles, which radiate from the posterior outer corners of the septum, suggesting that the fibers, usually devoted to retracting in a nearly vertical plane the siphons toward their angular insertion (pallial sinus) on the shell, are here spread in a horizontal plane. Beside the fasciole of fibers at the corners, there is a loosely arranged central bundle behind the foot, while the rest of the septum is more thin and fibrous, and the vertical roots of the septal muscles far less strong and prominent in proportion than in *Cuspidaria*. The arrangement of the fibers of the muscular tissue is singularly loose, and in the central area irregular; quite different from the solid tissue of the septum in *Verticordia*, or the compact bands observable in *Cuspidaria*.

The most noticeable feature in this specimen was the condition of the ovaries. These ramified over the posterior part of the visceral mass, terminating in bifurcated or trifurcated sacs, largest at their distal extremity, and somewhat fig-shaped. These were crammed with ova and projected from the surface of the visceral mass into the upper chamber above the septum. All were turgid; some had already burst and partly discharged their contents into the chamber; others seemed on the point of doing so; the alcohol had coagulated the escaping ova *in situ*, in the most perfect manner, the whole process thus being displayed. It is probable, as suggested by me in 1886, that the chamber serves to some extent as a marsupium or shelter for the ova and young, and that they are not discharged into the surrounding element at once. This is undoubtedly the case in *Modiolarca*.

Family POROMYIDÆ Dall.

Poromyidæ Dall, Bull. Mus. Comp. Zoöl., XII, p. 280, 1886; XVIII, p. 452, June, 1889.

The characters of this family are peculiar and exhibit an extreme specialization in the matter of the siphonal septum and the development of new breathing organs upon it, while the normal ctenidia have become obsolete. As the matter has been discussed with, as I believe, erroneous conclusions and assumptions by Dr. Paul Pelseneer in his account of the Anatomy of Mollusks in the series of reports on the scientific results of the *Challenger* expedition, it seems well to include here the data and conclusions to which a study of the Fish Commission and other material has conducted the writer. This has already been stated elsewhere, in the appendix to my Report on the *Blake* Mollusca, Part II, but as that publication is likely to be somewhat restricted in its audience, compared with the U. S. Fish Commissioner's reports, it is hardly necessary to apologize for introducing the same matter here; especially as it is based directly on the *Albatross* collection. Part of the data will be found under the heads of the several species, the rest is here assembled for reference.

In 1886 I separated from *Poromya* the forms which, when adult, have the hinge teeth obsolete, under the name of *Cetoconcha*. This group included not merely those with a double posterior row of modified septal orifices on each side, such as *C. bulla*, the type, and *C. margarita*, but also certain species of *Poromya*, in which the hinge teeth are feeble or obsolete in the adult, while in the typical *Poromya* they continue strong. I called attention to the fact that the soft parts of these species did not differ essentially from *Poromya*, but hardly felt justified in separating them from the typical *Cetoconchæ*. It is probable that it would be better for them to form a section of *Poromya* which may be called *Cetomya;* while the typical *Cetoconcha* may perhaps be generically separated from *Poromya*. The group in question was named *Silenia* by Mr. E. A. Smith, in his report on the *Challenger* Lamellibranchs, but that name had already been used in zoölogical nomenclature, and so was preoccupied. The observations of Pelseneer on the anatomy of *Silenia* leave no room for doubt that it is identical with *Cetoconcha*, as represented by its type and by *C. margarita*. Now that wider research has shown more clearly the characters of *Poromya* and *Cetoconcha*, the attempt of 1886 to diagnose both forms in a single definition seems confused, but with this explanation it should be clear enough that the facts were observed and recorded in members of each group, and that the apparent confusion in the diagnosis resulted from a feeling of conservatism in the matter of subdividing genera; a proceeding which has, of late years, on some occasions been so shamefully abused.

The researches of the U. S. Fish Commission have added some most interesting and peculiar species of this family, which are more fully described in another part of this report. The forms not so described have been grouped together here.

Cetoconcha bulla was described rather fully by me in 1886, and that description merely requires the addition of the statement that the lamellæ described are subtubular and form the lips to the septal orifices. In using the term "ventral surface" at that time for the under side of the septum and "body cavity," the reader will not be misled into the supposition that the *visceral mass* was the "body" intended; for, though the words may have been ill chosen, the relations of the visceral mass were clearly stated, although the very important relation of the upper chamber to the anal siphon was not understood at the time.

There is in this species a distinct bunching of the muscular fibers at the posterior outer corners of the septum, from which points they extend in a somewhat radiating manner. The soft parts, though more rotund and with a different number of septal orifices, resemble sufficiently those of *Cetoconcha Sarsii* Smith, as digrammatized by Pelseneer. For each orifice two lamellæ are usually counted in the report of 1886, as the lips of the septal orifices generally appear paired and arched, forming a segment of a circle. In *C. bulla*, in the anterior series, there are five orifices on each side; the inner posterior series have three to five and the outer posterior series two, or possibly three, orifices each. The number of posterior orifices is not the same in the two specimens of *C. bulla* examined.

In none of the specimens of *Cetoconcha* examined by me were the inner ends of the four posterior series so widely separated as in Pelseneer's Fig. 9 of *Silenia Sarsi.* They always seemed closer together, and more evidently radiating from a central elevation on the septum behind the foot. But too much stress must not be laid on the discrepancies of his diagrams, which are not and do not appear to be intended for exact and complete portraits. In this species a trace of the lateral arrangement of the siphonal muscles remains, while compared with *Cuspidaria* the septal muscles are still in a transitional state.

Cetomya elongata Dall. In the single specimen of this form the branchial areas are composed of lamellæ, between which at their bases are narrow fissures, bridged longitudinally by slender fibers, which act as regulators. In this species the two areas are similar, and resemble those of *Cetomya tornata* Jeffreys, as figured by Pelseneer.

Cetomya albida Dall. In young specimens of this and other species the membranes of the septum, etc., are extremely delicate. The use of too concentrating hardening agents or the incautious touch of a probe will produce lesions which may be indistinguishable from normal fissures. To make sure that nothing of this sort shall happen, it is necessary to float the soft parts in a cup of water and turn them about with delicate forceps. This is not convenient in all respects for observation, but with time and patience the characters may be made out.

Young specimens of this species show the lamellar areas as usual, with the depressions above them, in the floor of the upper chamber, but the fissures are not open; a fact which leads me to believe that they appear only with maturity. A very delicate membrane seems to hold the distal margins of the lamellæ together, so that a delicate probe passes over without separating them.

General considerations on the nature of the septum in Poromyidæ and Cuspidariidæ.—The facts above and others elsewhere stated indicate that the septum in these groups is essentially a prolongation forward and a specialization of the ordinary siphonal septum. The septum, as pointed out in *Cardium*, may be so prolonged, while the normal gills are fully developed and unconnected with it. In *Verticordia* it may be so prolonged, and may have acquired a conspicuously fleshy texture without fissures, while the gills lie prone upon it, more or less adnate. The muscular apparatus by which the siphons are retracted, and whose normal points of origin are at the side of the ordinary septum, appear to be shifted to its surface. Different species show this process in different stages of completion; and in the only case among the *Poromyas*, where the fibers follow the normal direction in other *Pelecypods*, the septum is destitute of the muscular structure which is so prominent in the other *Poromyas*. In the specialization of the septum the musculation develops from behind. When branchial laminæ are situated upon the septum, and are not simply the ordinary ctenidia in an adnate condition, the addition of a second series is made at the posterior end, and all the branchial areas appear to receive their blood supply from behind.

There is not a particle of evidence to prove that the septal branchial lamellæ of *Poromya* and *Cetoconcha* are homologous with the ctenidia of *Verticordia*, *Lyonsiella*, *Perna* or *Cardium*. The fact that *Cuspidaria* has neither ctenidia nor any specialized laminæ on the septum lends probability to the assumption that the two series represent a parallel among these Pelecypods to the ctenidia and the peripedal laminæ in *Acmæa*, *Scurria*, and *Patella*, among the *Docoglossa*. That is, that the septal laminæ are a new and special development, which functionally replace, but are not homologous with, the original ctenidia. If this view is doubted, the burden of proof lies upon those who call it in question.

It may be asked whether any hypothesis can be suggested by which this peculiar specialization may be accounted for. The law of economy in development, which calls for the maximum of function with the minimum expenditure of tissue, and the other rule, which associates with greatest vigor of life the most successful oxygenation of the blood, together with the obvious benefits to be derived from temporary protection of the newly hatched larvæ, will enable us to suggest an answer.

The prolongation forward of the siphonal septum, especially in forms with short siphons, like *Poromya* and *Lyonsiella*, will evidently promote successful aeration of the blood by cutting off from the branchial chamber the water of the anal chamber, fouled more or less by the effete products discharged into it. A certain amount of fibrous tissue must be developed to form this septum. It is clear that an economy of tissue would result from the transfer of retractorial functions to the septum and the obsolescence of the lateral retractile musculature. A further economy would result from the utilization of this large sheet of tissue for branchial purposes, and a diminution of the tissue previously expended in the mass of the ctenidia. The habit of the larvæ, so common among Pelecypods, of nestling for safety in the branchial folds, would lead directly to the utilization of the chamber as a refuge. But a close chamber such as we see in *Verticordia* would, from the less pure character of its contained sea-water, be less favorable than one into which the water could be more freely admitted by any means which would not imply an admixture of the foul water with that of the branchial chamber below. A system of orifices like those of *Myonera* would accomplish this. A subsequent development of the muscular tissue of the septum, so that it could operate somewhat after the fashion of a pump and voluntarily frequently renew the water in the anal chamber, would obviously be beneficial. By the effect of stimulation the margins of the orifices thus subjected to repeated strong currents of fresh water would be likely to undergo a specialization of respiratory functions as compared with the rest of the surface of the septum, which would result in something like the tubular gills of *Cetoconcha*, or the lamellæ of *Poromya*.

The gradual diminution of the ctenidia and increase of the area of the siphonal septum is illustrated by such a series as *Lyonsia*, *Lyonsiella*, and *Verticordia*, all of which possess true ctenidia.

The gradual specialization for branchial purposes of the septum after the extirpation of the ctenidia would be illustrated by the series from *Myonera* and *Cuspidaria* to *Cetoconcha* and *Poromya*.

While the above chain of hypothesis harmonizes with the observed facts in a satisfactory manner, it is stated merely as a possible hypothetical explanation, and not as a theory to which the writer must stand permanently committed.

General summary.—Premising that in this article the word *ctenidium* is employed to designate the normal typical gill of Pelecypods, in any of its modifications, as opposed to temporary or local branchial organs of different origin, the facts just reviewed may be briefly summarized.

(1) In many groups of Pelecypods the ctenidia are more or less united behind the foot, so as to divide the peripedal chamber into an upper or anal and a lower or branchial portion. In these cases (*Perna*, *Modiolarca*, for example) there is no important modification of the structure of the gills, and the septum is truly branchial in character, and the siphonal septum takes no part in the formation of the partition.

(2) In other forms, the siphonal septum is extended forward to form a partition either (A) unmodified (*Cardium*), (B) thickened without orifices (*Verticordia*), (C) assuming a retractile function (*Cuspidaria*) with orifices, (D) only partially retractile (*Dermatomya*) with single lateral series of orifices, or (E) with an incomplete double lateral series of orifices (*Cetoconcha*): In these cases the breathing organs may be (A) unmodified ctenidia, (B) depauperated adnate ctenidia, (C) the general surface of the septum without ctenidia or specialized lamellæ, (D) with only specialized flat lamellæ, or (E) with specialized subtubular proliferations. In these cases the structure of the septum appears to be wholly independent of the ctenidia, though in *Verticordia* they are adnate upon its surface.

(3) There is one form (*Lyonsiella abyssicola*) in which the siphonal septum and the ctenidia are stated to be mutually attached, so that the septum may be said to be of a compound formation, though in another species of the same genus (*L. radiata*) the septum is of the kind described in paragraph 1. The first statement stands in need of confirmation.

(4) The orifices in the septum of *Poromya* seem to be closed, or partly closed, in youth, and open with the attainment of sexual maturity.

(5) The anal chamber, as indicated in 1886, seems to fill the office of a marsupium.

(6) The tissues of the septum may therefore be derived from structures diverse in their origin, in some cases ctenidial and anterior, in others siphonal and posterior.

(7) Finally, from these facts it is evident that Dr. Pelseneer's assumption, that the septum is essentially ctenidial in its origin, is unwarranted, and his group *Septibranchia*, as defined by him, is founded on an error of observation. While as a group-name it may be used to indicate features of structure whose origin he misunderstood, yet, from the purely adaptive nature of these features and their variations in forms otherwise closely related, the name has no claims for adoption either in a strictly genealogical or an eclectic system of classification. It may be added, that the "proof" that *Poromya* and *Silenia* (=*Cetoconcha*) are more nearly related to each other than to *Cuspidaria*, which Dr. Pelseneer claims to be his work (*op. cit.*, p. 25), had been published by me more than two years previous to the appearance of his paper, and exemplified in the classification I then proposed; a classification which nothing since published has pretended in any way essentially to

modify. This classification, augmented by the new discoveries of the past three years, may be expressed in brief as follows:

Family *Cuspidariidæ*: abranchiate, siphoseptate, septum foraminate.
  Genus *Cuspidaria* (etc.) with long siphons; oral palpi obsolete.
  Genus *Myonera*, short siphons; oral palpi absent.
Family *Poromyidæ*: septibranchiate, siphoseptate.
  Genus *Poromya*: teeth strong; oral palpi large; foramina of septum slit-like, between the close-set lamellæ arranged in two interrupted longitudinal series; pallial sinus obsolete; surface of shell granular.
    Subgenus *Dermatomya*: shell not granular; pallial sinus developed; hinge strong.
    Subgenus *Cetomya*: shell granulous; pallial sinus obsolete; hinge teeth obsolete in the adult.
  Genus *Cetoconcha*: hinge teeth obsolete in the adult; pallial sinus obsolete; siphoseptum foraminate, the foramina arranged in four longitudinal series, solitary, the subtubular lips filling the office of gills.
Family *Verticordiidæ*: siphoseptate with small adnate ctenidia; oral palpi almost obsolete; septum imperforate.

Lyonsia and probably *Lyonsiella* may be called branchioseptate, and should be referred elsewhere.

Genus **POROMYA** Forbes.

Poromya cymata sp. nov.

Plate VIII, Fig. 4.

Shell small, ovate, inequivalve, the right valve most inflated and larger; hinge of the normal *Poromya* like *P. granulata;* umbo in the right valve high, inflated, prominent; anterior end rounded; posterior end with a narrow, sharp keel radiating from the umbo between two shallow, wide, gently excavated furrows which undulate the margin; surface covered with rather sparsely set granules, coarser toward the margin, finer on the umbo and posterior waves and disposed in radiating lines; left valve (as in *Corbula*) proportionately longer and less high and with deeper excavations where the furrows come to the margin; the furrows are also wider and extend further forward on the valve, which is less inflated than the right valve; the granulations, too, seem more close set and a little more irregular; there is no lunule or escutcheon; the epidermis is pale yellowish, under which the surface seems iridescent; the interior is brilliantly pearly; the muscular scars are faint, the pallial line simple, with some flexuosity near the posterior scar, but too irregular to be termed a sinus; the whole interior shows indications of radiating striæ which appear as marked grooves or crenulations on the basal margin of the valves. Right valve, altitude 10; longitude 9; diameter 3.5^{mm}. Left valve, altitude 8.5; longitude 11; diameter 3^{mm}. These valves are not pairs.

HAB.—At U. S. Fish Commission Station 2762, east of Rio Janeiro, in 59 fathoms, mud bottom; temperature 57°.1 F.

Only detached valves of this handsome and strongly sculptured species were obtained. Its nearest relative is a Korean species represented by an imperfect valve collected by Captain St. John, in the Jeffreys collection. The Korean shell is less strongly furrowed and the furrows are more longitudinal than in the present species. *P. cymata* is notable also for the crenulation, or rather the vertical grooving of the internal basal margin, a feature I do not remember noting in any of the other species. The pallial line is more irregular as it nears the posterior adductor scar than in the type of the genus, but it does not show a definite sinus as in *Dermatomya.* The species is evidently very near the border line and its septum will probably be found to be less muscular than in such species as *P. granulata.*

Subgenus CETOMYA Dall.

Poromya microdonta sp. nov.

Plate VIII, Fig. 6.

Poromya sublevis Dall, Bull. Mus. Comp. Zoöl., XVIII, p. 448, 1889; not of Verrill.

HAB.—U. S. Fish Commission Station 2723, in 1,685 fathoms, ooze, about 125 miles eastward from Chesapeake Bay, bottom temperature not taken, but that of the next station, near by, was 36°.3 F.

In this species, by carefully dissecting away the septum, which presented much the same appearance as that of *P. granulata* in Pelseneer's diagram (*op. cit.*, Pl. III. Fig. 7), several interesting facts were disclosed. The posterior lamellæ were not separated by fissures at their base. This seemed evident on an external view, but was made more certain by an inspection of the upper surface of the septum, where these openings, when they exist, are always conspicuous. The anterior areas were fissured, especially near the foot, but less so behind, so that when I first examined this species, taking the extreme delicacy of the membranes into account, and the apparently imperforate character of the posterior areas, I suspected that the fissures were due to tearing or incautious probing. A reversal of the septum and an examination of other species showed, however, that there are variations in this respect, and that Pelseneer had correctly described the conditions which exist in some of them. An interesting feature disclosed by the examination of the septum under transmitted light was, that the blood-vessels which supply the branchial lamellæ appear to reach them from behind, a separate vessel starting from the vicinity of the siphons and running a somewhat irregular course to each of the lamellar areas on each side. There seemed to be no continuation of these vessels anteriorly in front of the areas which they serve. The ovisacs are not lobulated, as in *Myonera*, but more evenly spread over the posterior surface of the visceral mass. The ripest eggs were large and conspicuous. There was no evidence of their extrusion through the covering of the visceral mass, as in *Myonera*, though this may take place later.

Maximum altitude of shell, 11.5; maximum longitude, 10.5; diameter, 9mm. This form has almost exactly the outline and size of *P. sublevis* Verrill, to which I at first referred it. But that species has the typical teeth of *Poromya*, while in this the only tooth in the right valve is a single slender spur-like cardinal, and the left valve is almost edentulous. In its teeth this species agrees much more nearly with *P.* (*Cetomya*) *tornata* than with any of the normal species, and, like that, has a twist in the posterior rostrated part of the shell which I have not observed in any genuine *Poromya*, and which is not mentioned by Verrill in his description of *P. sublevis*, of which I have not had an opportunity of seeing specimens. I can hardly (after seeing many specimens of *Poromya*) believe that such differences in the hinge are not of specific value.

Subgenus DERMATOMYA Dall.

Dermatomya Dall, Bull. Mus. Comp. Zoöl., XVIII, pp. 449, 452, June, 1889.

Dermatomya mactroides Dall.

Plate VIII, Fig. 8.

Poromya (*Dermatomya*) *mactroides* Dall, Bull. Mus. Comp. Zoöl., XVIII, p. 449, June, 1889.

Shell large, stout, strong, with a strong epidermis, olive gray toward the beaks, paler, inclining to greenish, toward the margins in the adult; epidermis raised into wrinkles on the posterior area and folding in over the basal margins; young shell with a few sparse granulations near the anterior and posterior margins, adult without visible granulations, the epidermis mostly shining and the shell showing iridescent through it; the young are subrhomboidal, the adults have the beaks prominent, high, subcentral; the anterior end rounded, the posterior very slightly produced; surface sculptured only with more or less evident incremental lines; lunule and escutcheon are visible on a close scrutiny, though not marginated by a line; the former is cordate, the latter narrow and long; hinge of *Poromya*, strong; ligament short, half internal; interior faintly iridescent, pallial and muscular scars distinct but not emphatic; the pallial line is deeply and rather narrowly sinuated; the basal margin is perfectly plain; altitude of adult shell, 16; longitude, 18; diameter, 12mm.

HAB.—U. S. Fish Commission Stations 2781, 2783, and 2785, on the west coast of Patagonia, on a muddy bottom in 122, 348, and 449 fathoms; bottom temperature 46°.9 to 49°.9 F. Also at Station 2793, in 741 fathoms, mud; bottom temperature 38°. 4F. off the coast of Ecuador.

The superficial resemblance to a small *Mactra* presented by this shell needs no further comment. It is sufficiently evident.

This fine species differs from the typical form of the genus in the absence of the superficial granulations, and in the presence of a deep and strong pallial sinus, which characters indicate that it should form a special section of the group. The hinge is also remarkably coarse and strong.

In the type of *Poromya* the pallial sinus is obsolete; its retractor muscles are either mainly incorporated in the septum, the muscular contractions of which serve to move the siphons, or they are replaced by the septal muscles. In the present species, however, there is a large and strong pallial sinus with its usual muscles, and the septum is consequently only very slightly furnished with muscular fibers, and does not serve to retract the siphons. The valve to the branchial siphon is large, and the palps are enormous. The anterior edges of the anterior palps are notched or papillose toward the median line, a condition not observed in the other species. The foot is pointed and slightly geniculate. There are seven anterior and eight or nine posterior gill lamellæ; the two areas are rather narrow, and their ends closely approach one another near the middle of the foot on each side. In front of the ridge which precedes the large branchial valve, and between it and the foot, are four or five quite prominent elevations of the surface, closely resembling the branchial lamellæ, but with their length in the axial direction of the animal. There are no fissures between these, but they seem very like branchial lamellæ in process of development. Both the longitudinal branchial areas on each side are fissured, and their blood-vessels reach them from behind.

Suborder MYACEA.

Family CORBULIDÆ.

Genus **CORBULA** Bruguière.

Corbula Dietziana C. B. Adams.

This species was obtained at the Abrolhos Islands, near Porto Allegre, Brazil. It extends northward to Cape Hatteras, and was previously known to extend southward only among the Antilles.

Corbula Barrattiana C. B. Adams.

Corbula disparilis Orbigny.

Corbula cymella Dall.

The above mentioned three species were collected at Station 2758, 90 miles southeast from Cape San Roque, in 20 fathoms, shelly bottom, off the Brazilian coast.

Family SAXICAVIDÆ.

Genus **SAXICAVA** F. de Bellevue.

Saxicava arctica Linné.

This well known shell, indistinguishable from Greenland specimens, was collected at Stations 2768 and 2770, off Cape Delgado and Spiring Bay, eastern Patagonia, in 43 and 58 fathoms, sand.

Class SCAPHOPODA.

Order SOLENOCONCHIA.

Genus DENTALIUM Linné.

Dentalium megathyris sp. nov.

Plate IX, Fig. 1.

Shell remarkably stout and solid, moderately curved; surface, when not eroded, shining; color yellowish white, generally with some dark extraneous matter lodged in the grooves of the sculpture; anal end circular, small, simple, with a sharp edge, about 2^{mm} in diameter; toward this end the shell is more curved than anteriorly; surface with strong flattened longitudinal threads about 1^{mm} from center to center, the interspaces sharply grooved in rather deep square-sided channels; about the middle of the shells the ribs begin to bifurcate so that the anterior sculpture, though of the same character, is some two or three times as fine as the posterior; in old age the sculpture is interrupted around the aperture; transverse sculpture only of fine incremental lines; oral aperture sharp edged, a little oblique, nearly circular, slightly flattened in an antero-posterior sense; interior milk-white; texture of the shell porcellanous with an external chalky stratum under the smooth exterior, which is frequently much eroded even in life; maximum longitude of shell, 95; diameter of aperture, 17.5; antero-posterior diameter of same, 15.5^{mm}.

HAB.—U. S. Fish Commission Station 2807, near the Galapagos Islands, Pacific Ocean, in 812 fathoms, globigerina ooze, bottom temperature 38°.4 F.; also off Chiloe Island and southwest Chili at Station 2788 and 2,789, in 1,050 and 1,342 fathoms; temperatures 36°.9 and 35°.9 F.

This is one of the finest species of the genus known, and was taken alive in some numbers. The young recalls *D. ceras* Watson, but the shell changes in rate of increase and form of longitudinal ribs as it grows. It is a little straighter near the anal end, and the adult is more funnel shaped, with flatter ribs than in *D. ceras*.

The radula is short, with the formula $\frac{1}{(1+1)\,1\,(1+1)}$. The median tooth is wide, subrectangular, arched a little in front. The laterals on each side have a projecting stout cusp; the uncini are flat rhomboidal plates. The whole radula bears a strong resemblance to that of *Entalis striolata*, as figured by G. O. Sars. (Moll. Reg. Arct. Norv., t. I, f. 1, 1*a*.–*c*.) The œsophagus is short; the stomach short and cordate, stuffed with foraminifera. The soft parts, as preserved in alcohol, seem ridiculously small and out of proportion to the massive shell.

Dentalium callithrix Dall.

D. callithrix Dall, Bull. Mus. Comp. Zoöl., XVIII., p. 427, Pl. XXVII., Fig. 10, June, 1889.

This species was collected at Station 2751, south of the island of St. Christopher or St. Kitts, in the West Indies, in 687 fathoms, ooze; temperature at the bottom 39°.9 F.; and at Station 2754, east from the island of Tobago, in 880 fathoms, ooze; temperature 37°.9. It has also been found among the dredgings made at Rio Janeiro many years ago by the Wilkes Exploring Expedition.

Dentalium ensiculus Jeffreys.

D. ensiculus (Jeffreys, 1877) Dall, Bull. Mus. Comp. Zoöl., XVIII., p. 428, Pl. XXVII. Fig. 12, 1889.

D. didymum Watson, 1879.

D. sigsbeeanum Dall, 1881.

Collected at Station 2644, off Cape Florida, in 193 fathoms, sand; temperature 43°.4.

This species is common to the north Atlantic, but so far has not been found south of the Antilles.

Dentalium ceras Watson.

Collected at U. S. Fish Commission Station 2763, in 671 fathoms, globigerina ooze, temperature 37°.9, 240 miles east from Rio Janeiro. This locality helps to bridge the gap between the Pacific station west of Valparaiso, where the *Challenger* found it, and the stations in the Antilles and the Gulf of Mexico, where it was obtained by the *Blake*.

Dentalium candidum Jeffreys.

This species was found with the preceding and also at Station 2760, 90 miles north from Ceara, Brazil, in 1,019 fathoms; temperature 39°.4 F. It was obtained by Jeffreys in the northeast Atlantic, in 410 to 1,750 fathoms, and on the northeast coast of the United States, on the Carolina coast and northward, by the U. S. Fish Commission, in 843 to 1,309 fathoms. The present localities greatly extend its southward range.

This is the *D. solidum* of Verrill, and I have received it from a correspondent in Europe, under the name of *D. ergastricum* Fischer, from deep water in the Bay of Biscay.

Dentalium perlongum Dall.

Collected at Station 2751, off St. Kitts, West Indies, in 687 fathoms, ooze, temperature 39°.9; at Station 2754, east from Tobago, in 880 fathoms, temperature 37°.9; and at Station 2760, 90 miles north of Ceara, Brazil, in 1,012 fathoms, coral, temperature 39°.4 F. It ranges northward to the Carolina coast.

Dentalium Gouldii Dall.

D. Gouldii Dall, Bull. Mus. Comp. Zoöl. XVIII, p. 424, Pl. XXVI, Fig 4, June, 1889.

This extends from South Carolina to the Antilles and southward to Station 2762, east from Rio Janeiro, in 59 fathoms, mud; temperature 57°.1 F.

Genus CADULUS Philippi.

Cadulus albicomatus sp. nov.

Plate IX, Fig. 8.

Shell resembling *C. spectabilis* Verrill, but larger, with a less prominent equator, more compressed in an antero-posterior direction, and with the anal opening produced at the sides and roundly excavated in front and behind instead of notched laterally and produced medianly. Color milk-white; incremental sculpture indicated only by more or less translucent rings in the shell substance; longitudinally sculptured by extremely fine sharp grooves with equal interspaces which cover the whole of the shell; curvature moderate, nearly uniform, slightly more marked near the anal end; the whole shell distinctly compressed though not flattened, except below the oval aperture, where the shell is impressed, making a shallow sulcus extending backward nearly two millimeters, and in front arching the margin so that the perfect aperture is distinctly reniform with sharp thin edges. There is no swollen equatorial girdle; the greatest diameter is near the posterior end of the above-mentioned sulcus, whence the shell tapers evenly backward; aperture slightly oblique; anal aperture nearly circular, concavely arched, but not notched in front and behind; longitude of shell on its dorsal chord, 24; perpendicular to the chord, 2; diameter of oval aperture, 3; antero-posterior diameter, 1.5; diameter of anal aperture, 1; maximum diameter of shell, 3.4; antero-posterior diameter of shell, 3^{mm}.

HAB.—U. S. Fish Commission Station 2792, in 401 fathoms, mud; off Manta, Ecuador; temperature 42°.9 F.

This species was obtained about 40 miles south of the equator in west longitude 81°. It is one of the largest and finest species of the genus, and the only one known to me which is distinctly longitudinally sculptured.

Cadulus quadridentatus Dall.

Found at Station 2765 in 10½ fathoms, sand, off Rio de la Plata. It extends northward to Cape Hatteras and has also been found at Fernando Noroñha and the west coast of Florida in 7 to 50 fathoms.

Cadulus tumidosus Jeffreys.

Dredged at Station 2760, 90 miles north from Ceara, Brazil, in 1,019 fathoms, broken coral, temperature 39°.4 F. It has been dredged in deep water in several parts of the North Atlantic, the Bay of Biscay, and near the Canaries. The specimens have been compared with those in the Jeffreys collection.

Class GASTROPODA.

Subclass ANISOPLEURA.

Superorder EUTHYNEURA.

Order OPISTHOBRANCHIATA.

Suborder TECTIBRANCHIATA.

Family ACTÆONIDÆ.

Genus ACTÆON Montfort.

Actæon delicatus Dall.

A. delicatus Dall, Bull. Mus. Comp. Zoöl., XVIII, p. 41, Pl. XVII, Fig. 5, 1889.

This Antillean species was obtained at Station 2771, off Point Gallegos, eastern Patagonia, in 50½ fathoms, sand, temperature 49°.4. This discovery carries its known range southward nearly the whole length of the continent of South America.

Actæon curtulus sp. nov.

Shell small, short, subglobular, white, not polished; surface covered with sharp, deep, close set, spiral grooves, minutely punctate at bottom; whorls three, beside the prominent, polished, smooth, globular, sinistral nucleus; suture distinct, not channeled; outer lip thin, simple; body with a thin wash of callus; pillar short, thin, very much twisted, so that its outer edge presents a plait-like appearance, while the shell seems almost canaliculate, though the pillar is continuous with the basal margin; above the twisted edge and separated from it by a deep channel is a second less prominent plait; altitude of shell, 3; diameter, 2^{mm}.

HAB.—West coast of Patagonia, at Station 2783, in 122 fathoms, mud, temperature 48° F.

This little shell is mostly comprised in the last whorl and appears mature. It recalls *Stilifer*, or a small snow-white *Pedipes*, as much as anything, and is different from any recent species of the group I have seen.

Actæon perconicus sp. nov.

Plate XII, Fig. 7.

Shell pear-shaped or conic, with rather acute spire, polished ivory white, with four whorls beside the nucleus; transverse sculpture of incremental lines; spiral sculpture of three to five close-set, sharp, punctate grooves in front of the suture, more distant anteriorly, and a similar but more numerous and uniformly spaced series just behind the pillar, behind which again are four or five widely separated similar grooves, the posterior near the periphery; between them and near the periphery, as well as behind it, are no grooves or but faint spiral obsolete striæ; suture distinct but not channeled; last whorl much the largest; outer lip straight, simple, slightly thickened; body with a moderate deposit of callus; pillar as in *A. curtulus*, but less strongly twisted and with the plait and recurved margin subequal; although the margin is continuous, there is a rather deep sulcus behind the anterior end of the pillar, corresponding to a groove, which bounds the columella callus; longitude of shell, 5; latitude, 3; longitude of aperture, 3^{mm}.

HAB.—Near the Galapagos Islands, in the Pacific, in 812 fathoms, ooze; temperature 38°.4 F.

This shell and the last species seem to stand in an intermediate position between *Actæon* of the typical kind and *Cinulia*. If the outer lip should eventually become much thickened, of which, however, there is no satisfactory evidence, these shells might be referred to *Cinulia*. If the *A. curtulus* recalls *Pedipes mirabilis* Muhlfeldt in its form and sculpture, *A. perconicus* recalls *P. elongatus* Dall.

Family TORNATINIDÆ.

Genus **UTRICULUS** Brown.

Utriculus domitus Dall.

Collected at Station 2751, south from St. Kitts, in 687 fathoms, ooze; temperature, 39°.9 F.

Family SCAPHANDRIDÆ.

Genus **SCAPHANDER** Montfort.

Scaphander nobilis Verrill.

Dredged at Station 2754, east from Tobago, in 880 fathoms, ooze; temperature 37°.9 F. It extends northward to Delaware Bay, in deep water.

Scaphander interruptus sp. nov.

Plate XII, Fig 12.

Shell in many respects resembling *S. lignarius* and best described by comparison with it; shell of a livid or grayish straw-color, not the yellow or reddish brown of *lignarius;* the tip of the spire is smaller in proportion and more pointed; the axis is pervious as in *lignarius*, but the perforation is more cylindrical and does not become funnel-shaped as the shell enlarges to maturity; the shell averages more slender; the callus on the body is not reflected so far and especially on the anterior part of the pillar; the grooves of the surface in *S. lignarius*, without exception, are continuous, the punctures being arranged along their channels; in *S. interruptus* the spiral sculpture is composed of rows of short or longer punctuations or grooves, which do not unite to form a continuous line except close to the columella in front, and here rather as the result of crowding and over-lapping; these short grooves are not punctate at bottom as in *S. lignarius*, but are apt to alternate stronger and weaker, and are more close-set than in *lignarius* of the same size; maximum longitude of shell, 33; maximum latitude of shell 17.5; of aperture, 13.5^{mm}.

HAB.—Station 2788, west coast of Patagonia, in 1,050 fathoms, mud, temperature 37°; and Station 2807, near the Galapagos Islands, in 812 fathoms, ooze, temperature 38°.4 F.

The specimens have been carefully compared with a very large series of *S. lignarius* in the Jeffreys collection.

Subgenus SABATIA Bellardi.

Sabatia bathymophila Dall.

S. bathymophila Dall (1881), Bull. Mus. Comp. Zoöl. XVIII, p. 53, Pl. XVII, Figs. 9, 9*b*. 1889.

This species, which was previously known to extend in deep water as far north as Fernandina, Florida, was obtained at Station 2744, 100 miles east from Delaware Bay, in 554 fathoms, mud; and at Station 2754, east from Tobago, in 880 fathoms, ooze; temperatures 38°.9 and 37°.9 F.

Genus **CYLICHNA** Lovén.

Cylichna Verrillii Dall.

This species was also obtained at Station 2754.

Genus **ATYS** Montfort.

Atys Sandersoni Dall.

A ? Sandersoni Dall (1881), *op. cit.* XVIII, p. 54, Pl. XVII, Fig 7.

This species was collected at Station 2758, 90 miles southeast from Cape San Roque, in 20 fathoms, shelly bottom, temperature 79°.1 F.

Family BULLIDÆ.

Genus **BULLA** Linne.

Bulla Krebsii Dall.

B. Krebsii Dall, *op. cit.*, XVIII, p. 56, 1889.

This species described from Guadalupe, West Indies, was collected at Station 2754, east from Tobago, in 880 fathoms, ooze; temperature 37°.9 F.

Order PULMONATA.

Suborder BASOMMATOPHORA.

Superfamily PETROPHILA.

Family SIPHONARIIDÆ.

Genus **SIPHONARIA** Sowerby.

Siphonaria ferruginea Reeve.

This species, which reaches as far north as Vera Cruz, Mexico, was obtained at the Abrolhos Islands, off Porto Allegre, Brazil.

Suborder STYLOMMATOPHORA.

Superfamily GEOPHILA.

Family HELICIDÆ.

Genus **HELIX** Linné.

Helix lactea Müller.

This well known South European species, being an article of diet with the Italians, has been introduced into those parts of South America where Italian emigration has been directed. At Montevideo it was collected in great abundance, not differing from Mediterranean specimens, except that the shells averaged somewhat darker in color, on the upper portion, than the European specimens with which I was able to compare them.

Superorder STREPTONEURA.

Order CTENOBRANCHIATA.

Suborder ORTHODONTA.

Superfamily TOXOGLOSSA.

Family TEREBRIDÆ.

Genus **TEREBRA** Lamarck.

Section ACUS H. & A. Adams.

Terebra (Acus) benthalis Dall, var. **nodata** Dall.

Plate v, Fig. 9.

Shell small, slender, polished, yellowish white, with a blunt, somewhat inflated nucleus, and thirteen (or more) somewhat flattened whorls; suture distinct, appressed, the presutural band narrow, bounded in front by a rather wide, shallow sulcus and ornamented by obscure rounded pustules, from ten to fifteen on each whorl; immediately in front of the sulcus is a row of larger and more prominent nodulations, the number on each whorl being the same as on the band; there are also a few transverse, sometimes sharp but generally obscure, ridges crossing the whorls; spiral sculpture of fine obscure lines, often obsolete, but pretty evenly distributed over the surface; aperture (broken) narrow, outer lip simple; pillar simple, without any marginal keel; canal narrow, not exhibiting any fasciole; base attenuated in front, gently rounded to the periphery. Maximum longitude of shell, 18.5; maximum latitude, 4^{mm}.

HAB.—U. S. Fish Commission Station 2750, off St. Bartholomew, West Indies, in 496 fathoms, fine gray sand; bottom temperature 44°.4 F.

The first three apical turns of this shell are smooth, then the sculpture above described begins. The soft parts were not obtained. It resembles the shell described in the *Blake* Report under the name of *benthalis* and is doubtless a variety of it, in which the longitudinal sculpture has become faint and the nodulations intensified.

Family CONIDÆ.

Genus **CONUS** Linné.

Conus Cleryi Reeve.

This species was collected at Station 2762, east from Rio Janeiro, in 59 fathoms, living; and at Station 2765, off the Rio de la Plata, in latitude 36° 43′, in 10½ fathoms, sand; temperature 59°.1 F.

The examination of these specimens leads me to believe that my suggestion in the *Blake* Report that *C. Villepinii*, F. & B., might be identical with *C. Cleryi*, is not likely to prove correct. They seem much more distinct than the figures of the species would indicate.

Family PLEUROTOMIDÆ.

Genus **PLEUROTOMA** Lamarck.

Subgenus LEUCOSYRINX Dall.

Leucosyrinx Goodei sp. nov.

Plate VI, Fig 1.

Shell large, thin, white, with a tinge of pale orange in the throat and on the pillar; whorls eight (or more), nucleus wanting in the specimens; surface generally slightly eroded, glistening when perfect; spiral sculpture below the periphery of narrow shallow grooves separating wider, half obsolete threads; at the periphery is an obtuse carina which is sharper on the early whorls; behind this is a wide shallow sulcus, behind which the whorl rounds to the distinct but unchannelled suture; on the upper or posterior part of the whorl the fine spirals are perceptible but fainter than in front of the periphery; transverse sculpture only of incremental lines; aperture elongated moderately wide; anal notch wide, rounded; fasciole slightly raised, not strongly differentiated; body with a thin transparent glaze; pillar strong, obliquely truncate, flaring, almost pervious, anteriorly more or less tinged with pale orange; canal long, thin, shallow, slightly recurved; outer lip prominent below the periphery, thin, sharp; maximum longitude of shell, 80; maximum latitude, 35^{mm}.

Operculum at first shaped like that of *Volutopsis*, the nucleus apical but the succeeding growth showing a tendency to a slight spirality; with subsequent growth this becomes inclosed by additions made all around the margin, and the adult operculum appears buccinoid, having a buccinoid outline, in the lower right hand part of which the nuclear part is inclosed. This singular form of operculum is not a deformity, but is common to several of the species of *Leucosyrinx* in which I have been able to examine this appendage. It is a feature which by gradual stages, represented by different species, approaches the normal Pleurotomoid operculum.

HAB.—U. S. Fish Commission Station 2788, in 1,050 fathoms, green mud, off the northwest coast of Patagonia, south latitude 45° 35′, west longitude 75° 55′, 3 degrees south of Chiloe Island; bottom temperature 36°.9 F.

This fine species recalls, in its general form and appearance, the inoperculate *Mangilia* (*Aforia*) *circinata* Dall, from Bering Strait and the Arctic Ocean. The soft parts were destroyed by desiccation before reaching me.

Leucosyrinx (Goodei var.?) persimilis sp. nov.

Plate VI, Fig. 3.

Shell resembling the preceding species except in the following particulars: It is more slender and of pure white, the peripheral carina is more anterior, the anal notch consequently wider, and the fasciole is not elevated; the peripheral carina is narrower and more distinct, but the sulcus behind it is much fainter; the pillar is thinner and so coiled as to be axially pervious to the very apex; the canal is not quite so shallow, and there is no color on the pillar or in the throat; the spiral sculpture is finer and more distinct. Maximum longitude of shell, 80; maximum latitude, 30^{mm}.

Operculum slightly more elongate, but in structure like that of the preceding species.

HAB.—U. S. Fish Commission Station 2791, latitude 38° 8′ S., longitude 75° 53′ W., off the southwest coast of Chili, in 677 fathoms, mud; bottom temperature 37°.9 F.; and Station 2793, in 741 fathoms, off the coast of Ecuador, in north latitude 1° 03′, west longitude 80° 15′; bottom temperature 38°.4 F.

This species is remarkably like the *L. Goodei*, but in a fair series the differences seem constant enough to deserve a name. The soft parts are whitish; the tentacles stout and blunt; there are no eyes or pedicels; the foot is wide and double-edged in front, rounded behind; there is a well-marked purpuriferous gland on the dome of the mantle; the penis is very large and of the usual form, with the terminal papilla retractile; the gills prominent and normal as well as the osphradium.

Leucosyrinx tenoceras Dall.

L. tenoceras Dall, Bull. Mus. Comp. Zoöl., XVIII, p. 76, Pl. XXXVI, Fig. 5, June, 1889.

This species, which extends northward to Cape Fear, North Carolina, was collected by the *Albatross*, at Station 2751, south of St. Kitts, in 687 fathoms, ooze; at Station 2754, east from Tobago, in 880 fathoms, ooze; and at Station 2763, 240 miles east by south from Rio Janeiro, in 671 fathoms, ooze; temperatures 37°.9 to 39°.9 F.

Leucosyrinx Verrillii Dall.

L. Verrillii Dall (1881), *op. cit.*, XVIII, p. 75, Pl. X, Fig. 5, 1889.

This fine species, which has the same northward range as the preceding, was found with it at Station 2751, and also at Station 2761, 150 miles south from Bahia, Brazil, in 818 fathoms, ooze; temperature 38°.9 F.

Subgenus PLEUROTOMA s. s.

Pleurotoma exulans sp. nov.

Plate V, Fig 7.

Shell solid, of a yellowish chocolate-brown, strongly sculptured, with eight or nine whorls, the tip eroded in all the specimens; whorls rounded, the region of the fasciole in front of the closely appressed suture flattish, constricted, and polished; transverse sculpture in front of the fasciole (on the penultimate whorl) of about fourteen short, stout, obliquely set riblets, which coronate the whorl and do not reach the suture in front; spiral sculpture of rather narrow shallow grooves, separating slightly-raised flattish, rather wider, threads; the last are finest on the fasciole and somewhat coarser near the canal, but tolerably uniform over the entire surface; notch rather wide, not very deep, rounded, and half way between the suture and the posterior ends of the peripheral riblets; outer lip thin, simple, produced in the middle; canal rather well defined, not very long; pillar obliquely trimmed off in front, of a creamy brown, with a thin polished glaze; axis not pervious; canal rather deep, flaring a little anteriorly. Maximum longitude of shell, 32; maximum latitude, 13^{mm}.

Operculum elongate pyriform, thin, straight, with an apical nucleus, somewhat concave.

HAB.—U. S. Fish Commission Station 2808, near the Galapagos Islands, in the Pacific Ocean, in 634 fathoms, coarse sand; bottom temperature 39°.9 F.

This fine species borders on the subgenus *Leucosyrinx*, but has the operculum, solid habit, and strong sculpture of *Pleurotoma* as restricted.

Subgenus GENOTA H. & A. Adams.

Section DOLICHOTOMA Bellardi.

Genota Carpenteriana (Gabb).

Pleurotoma (*Surcula*) *Carpenteriana* Gabb., Proc. Cal. Acad. Sci., III, p. 183, 1865.

HAB.—Monterey, Gabb. Santa Barbara Islands, Cooper; U. S. Fish Commission Station 2838, in 44 fathoms, mud, off Cerros Island, Lower California.

This interesting species, of which but few specimens are known, belongs to the section *Dolichotoma*, of which the type is the fossil *Pleurotoma cataphracta* of Brocchi. This form has a rather thick, stout, blackish operculum, recalling that of *Conus*, but of which the apical point is frequently broken or worn away. The scar on the inner side of the operculum is concentric and strong, but covers only the wider part of the appendage. This section of the *Pleurotomidæ* is frequently furnished with obscure thickened ridges on the pillar; they can be found in most specimens by cutting into the apical whorls even if the shell has no indication of ridges at the aperture.

The foot of this species is narrow, double-edged, and truncate in front, not auriculate, moderately pointed behind; the sides of the foot and surface of the body are irregularly dotted with small, and larger, round pustular elevations. The animal has a purpuriferous gland, and in the case before me, in dying, the fluid expelled from this gland appears to have dyed the whole body of the animal deep purple, which, under the action of the alcohol and time, has become largely brownish. The tentacles are wide and small, with a small, well defined eye on the outer angle. The verge is small, subcylindrical, except near the tip, which is (naturally or otherwise) somewhat flattened, clavate, and decidedly phalliform, terminating in a large subconic smooth papilla with a thickened girdle at its base. The gills and osphradium as usual. The proboscis is short, much attenuated anteriorly. There is a large poison gland situated as in *Bela*, and the individual teeth are much like those of *Bela;* for instance, those of *B. Gouldii* as figured by Verrill (Trans. Conn. Acad., V, Pl. LVII, Fig. 6*a*), but with the base of insertion less deeply notched than in that species, and with a slight angulation, not a barb, near the point.

Genus DRILLIA Gray.

Drillia Harfordiana Reeve.

This species, which reaches at least as far north as Vera Cruz, Mexico, was collected at the Abrolhos Islands, near Porto Allegre, Brazil.

Drillia pagodula Dall.

D. pagodula Dall, *op. cit.*, XVIII, p. 90, Pl. XIII, Fig. 6, 1889.

This species was also collected at the Abrolhos Islands. It is common to the Antilles and the Gulf of Mexico, and has been found on the west coast of Florida, in 50 fathoms.

Genus **MANGILIA** (Risso) Fischer.

Subgenus MANGILIA Risso.

Mangilia antonia Dall.

Plate V, Fig. 11.

Mangilia antonia Dall, Bull. Mus. Comp. Zoöl., IX, p. 59, August, 1881; XVIII, p. 116, Pl. X, Fig. 4, Pl. XI, Fig. 11, 1889.

HAB.—Gulf of Mexico to the Antilles, in deep water. Station 2751, south of St. Kitts, in 687 fathoms, ooze; and Station 2754, east of Tobago, in north latitude 11° 40′, west longitude 58° 33′, in 880 fathoms, ooze; temperatures 38° to 40° F.

The figures of this species heretofore given having all been made from young and immature specimens, it was thought well to figure the complete adult shell from some fine specimens collected near St. Kitts.

The specimen figured measures 18^{mm} in length; the largest (but not perfect) specimen obtained must have reached a length of 23^{mm}.

Mangilia exsculpta Watson.

M. exsculpta (Watson, 1882) Dall, *op. cit.*, XVIII, p. 117, Pl. XI, Fig. 9, 1889.

Antilles, *Challenger* and *Blake*, collected by the *Albatross* at Station 2750, off St. Bartholomew, West Indies, in 496 fathoms, sand; Station 2751, south of St. Kitts, in 687 fathoms, ooze; and Station 2754, east from Tobago, in 880 fathoms, ooze; temperatures 37°.9 to 44°.4 F.

This is a very peculiar looking shell. The specimen figured in the *Blake* report is only a young specimen. Those obtained by the *Albatross* were much larger and finer.

Subgenus CALLIOTECTUM Dall.

Shell with a vernicose epidermis, short, undifferentiated canal and no anal notch or fasciole; operculum with apical nucleus, increasing like that of *Fusus*, but curved instead of straight, though not coiled; animal blind, with a short sac-like proboscis, with no teeth or poison gland. Type *C. vernicosum* Dall, abyssal.

Calliotectum vernicosum, sp. nov.

Plate V, Fig. 8.

Shell slender, fusiform, covered with a brilliant chestnut-brown, closely adherent epidermis; whorls seven, without the nucleus, the tip more or less eroded in all the specimens, though living when taken; whorls slightly rounded, not inflated; sculpture chiefly of fine, subequal, flattened, narrow, slightly flexuous transverse plaits, which on the earlier whorls reach forward to the suture, but on the later ones become obsolete near the periphery, and tend to disappear altogether near the aperture on the last whorl of the adult shell; these plaits are separated by narrower, rather deep grooves, and end at the suture behind rather bluntly, though they can hardly be said to coronate it; there are thirty-five or forty of the plaits on the penultimate whorl; suture very distinct, slightly channeled, but not deep; there is no anal fasciole; the aperture is shaped like a melon seed, the outer lip evenly arched, projecting somewhat in front of the periphery, not thickened or reflected, and with no constriction for a canal; body and pillar without callus; the columella straight, very slender, not recurved; siphonal notch extremely shallow, hardly differentiated from the aperture; interior of the aperture polished, smooth, dark brown, the pillar livid white or flesh color; siphonal fasciole, none; lines of growth not prominent, the surface showing obscure faint spiral striæ or scratches, but no spiral sculpture. Maximum longitude of shell, 48; maximum latitude, 19^{mm}.

HAB.—Station 2793, off the coast of Ecuador, in 741 fathoms, mud, and Station 2807, near the Galapagos Islands, in the Pacific, in 812 fathoms, coral mud; temperatures in both cases 38°.4 F.

The first mentioned specimen was collected with *Leucosyrinx persimilis* and *Pleurotomella cingulata.*

There is between the internal aragonitic layer and the epidermis a rather thick layer of a cretaceous nature easily eroded, and the action of solvents upon this even in living specimens is extremely marked. The operculum is thin, yellowish brown, with strong growth lines and a large surface of attachment. It reaches a length of 10^{mm} and a breadth of 6^{mm}. It is shaped like that of *Fusus*, but more curved, and varies somewhat in form in different specimens. The nucleus is apical.

The soft parts are mostly yellowish white. There is a purpuriferous gland alongside the distal part of the intestine which ejects a dark rose-colored dye. The head is wide, the tentacles broad, flattened, and connate at the median sinus. The gills, osphradium, and siphon are as usual. The foot is wide, rounded-acute behind, double-edged and slightly auriculate in front. The proboscis is small and short, with large salivary glands whose axis carries a greenish streak. There is no poison gland or dental sac. The animal appears to be edentulous. The verge is large, stout, a little flattened, with its tip obliquely truncate, leaving a granulous oval area at the upper extreme of which is a small conical papilla. The anal orifice is not prominent. The surface exudes an abundant sticky mucus.

This very beautiful and remarkable shell is Pleurotomoid in its characters, though it wants the anal notch and fasciole. Although the operculum is arcuate it is not coiled upon itself. The figure, though accurate as far as the form is concerned, gives very little idea of the beauty of the brilliant brown epidermis and sharply incised sculpture.

Subgenus PLEUROTOMELLA Verrill.

Pleurotomella cingulata sp. nov.

Plate VI, Fig. 2.

Shell large, fusiform, of a rich reddish brown, deepest on the pillar, with a closely adherent, very thin, polished epidermis; whorls seven, without the nucleus, which is lost in the specimen, while the outer coat of the apical whorls is much eroded; whorls full and rounded, suture distinct, not appressed or channeled; transverse sculpture only of fine inconspicuous lines of growth; spiral sculpture of two sorts: first, a fine, sharp, slightly irregular striation, which covers the whole surface; secondly, of revolving elevated cinguli, of which three on the periphery are more widely and deeply separated and more elevated than the others; these three have interspaces equal to or wider than themselves; on the last whorl in front of the periphery the cinguli are flat-topped little elevated wide bands with narrower interspaces, this sculpture becoming obscure toward the canal; above the periphery is one well-marked cingulum slightly turreting the whorl which inclines from it to the suture in a flattened manner; aperture pointed in front, wider behind; pillar simple, perfectly straight, anteriorly attenuated; body and pillar with a thin dark brown glaze; outer lip very thin, sharp, crenulated by the outside sculpture, which also grooves the interior; notch shallow, wide; fasciole hardly visible; canal short, wide, hardly differentiated, straight. Altitude of shell 73; maximum diameter 30^{mm}.

HAB.—U. S. Fish Commission Station 2793, off the coast of Ecuador, in 741 fathoms, mud; bottom temperature 38°.4 F.

The soft parts of this species were preserved, but had been so hardened that the shell was nearly ruined in the effort to extract them. The surface is rather rugose, of a rusty brownish color; the foot is narrow, double-edged, and slightly auriculate in front, rather pointed behind. The tentacles are very short and stout, with no traces of eyes or peduncles.

The proboscis and all its appendages are absent, probably, being extended at the moment of capture, they were torn out by the edge of the dredge. The gill and osphradium are as usual.

I may mention here that in this, as well as nearly all the other cases of abyssal shells with well marked coloration, the specimen, though kept in the dark, has faded rapidly. It is now mostly of a pale chocolate-and-milk color, except at the points where it touches the bottom of the paper tray in which it is kept, or on the columella under the glaze.

Pleurotomella argeta sp. nov.

Plate VI, Fig. 5.

Shell polished, short-fusiform, snow white, eight-whorled; nucleus eroded in the specimen; whorls full, appressed in front of the suture, elsewhere gently rounded; transverse sculpture of delicate incremental lines; spiral sculpture of obscure almost microscopic striæ and a few close set extremely fine threads on the canal; aperture elongated; anal notch very shallow, rounded; leaving only a faint slightly flattened fasciole; outer lip sharp, simple, arched well forward, especially anteriorly; body without callus; pillar thin, white, short, slightly twisted; canal short, very wide, hardly differentiated; maximum longitude of shell 43; maximum latitude 20^{mm}.

HAB.—U. S. Fish Commission Station 2807, in 812 fathoms, mud, near the Galapagos Islands; bottom temperature 38°.4 F.

The characters of this species are as simple as possible, yet a more elegant and delicate shell can hardly be imagined.

The soft parts are yellowish brown and agree externally in all respects with those of the preceding species. Like that, it was impossible to extract them without wholly destroying the shell, as they had been placed in alcohol so strong as to make them as hard and tough as sole-leather. In most *Pleurotomidæ* there is very little if any muzzle between the tentacles; at least when the proboscis is wholly retracted the inner bases of the tentacles, somewhat vertically flattened, are connate at a shallow sinus in the middle line. In the present and the preceding species, however, the tentacles are widely separated and cylindrical, and there is a muzzle which is longer than the tentacles, when both are contracted in alcohol, into the center of which the proboscis is retracted and which has a flattish end almost as in *Litorina*. Something of the sort is found in *Conus* if the figures are to be believed. More investigation in regard to this character is required.

Pleurotomella (Gymnobela) agonia sp. nov.

Plate VI, Fig. 4.

Shell small, thin, bright yellow-brown, with six full and rounded whorls, the nucleus lost, but without doubt of the *Sinusigera* type; spiral sculpture in front of the fasciole of numerous sharp elevated threads with wider interspaces, between each pair of which, except on the canal, are one or two smaller intercalary threads; on the fasciole there are only a few comparatively faint threads, which do not rise above the transverse sculpture, while on the body the spiral sculpture is predominant though minutely undulated by the other; the transverse sculpture is composed of numerous fine, rounded, somewhat elevated threads with wider interspaces, forming a series of elegant concavely arched ripples on the anal fasciole, beyond which they become fainter, closer, and obscure, being over-ridden by the spirals which they minutely undulate; the fasciole is slightly impressed and extends to the suture, which is distinct but not channeled; the notch is shallow and gently rounded; the outer lip arched forward, sharp; the body covered with a thin glaze, in the aperture; the pillar thin, twisted, not pervious; canal short, distinct; maximum longitude of specimen 16; maximum latitude 8^{mm}.

HAB.—Stations 2807 and 2808, near the Galapagos Islands, in the Pacific, in latitude 0° 24′ south and longitude 89° 6′ west, in 812 and 634 fathoms, globigerina ooze and coral sand; bottom temperature 38°.4 to 39°.9 F.

This pretty little species is much like *P. engonia* Verrill, from deep water off the New England coast, but differs from it in having a finer and more elegant sculpture, rounder whorls, without the prominent angle on the shoulder of *P. engonia*, a narrower fasciole inclined to the suture at a greater angle, and a narrower and more differentiated canal. In *P. engonia* the ripples on the fasciole are strongest near the suture and are not very regular, while in the present form their regularity is conspicuous and they extend without weakening entirely across the fasciole.

Pleurotomella **Agassizii** Verrill, var. **permagna**.

HAB.—Station 2734, 124 miles southeast of Delaware Bay, alive, in 841 fathoms, soft mud, temperature 38°.5; and Station 2754, east of Tobago, in 880 fathoms, ooze, north latitude 11° 40′ and west longitude 58° 33′; temperature 37°.9 F.

This fine form resembles *Pleurotomella Agassizii* in general characters, and even in the rosy-brown tint of the columella, but in a specimen of each, with the same number of whorls, we find *P. Agassizii* has a length of 28 and a maximum breadth of 12.5^{mm}, while the variety *permagna* has a length of 35 and a breadth of 17.5^{mm}. Some specimens of *P. permagna* reach a length of 47 and a breadth of 22^{mm}. The number of transverse riblets on the last whorl varies in both species; in *P. permagna* there are eighteen to thirty. I have not seen any of the typical *P. Agassizii* with more than twenty ribs.

P. permagna differs from *P. Bairdii* in just the characters, except size, that *P. Agassizii* does, and from *P. Agassizii* it is distinguished only by its much greater size. The two may be distinct species or they may be two races of one species. Knowing the great variability of abyssal shells, I prefer to take the latter view for the present.

Pleurotomella **suffusa** sp. nov.

Plate XII, Fig. 10.

Shell small, slender, fusiform, the pillar suffused with yellowish pink, the exterior white, with a thin, pale epidermis and seven or eight whorls, without counting the nucleus; specimen somewhat eroded on the upper whorls, with indications of a shoulder or carina on the three whorls following the nucleus; suture slightly irregular, appressed, distinct, not channeled; spiral sculpture of fine threads, alternately larger and smaller, pretty uniform over the whole surface, with narrower interspaces, this sculpture fainter on the sutural side of the fasciole; transverse sculpture of faint, irregular, sharp-edged plications, strongest near the suture and on the obscure angle just in front of the fasciole, elsewhere nearly obsolete; fasciole very slightly impressed; notch very shallow; aperture long, narrow, pointed behind; outer lip sharp, arched forward; canal distinct, wide; pillar rosy, attenuated in front; axis almost pervious; body with a thin glaze over a slightly excavated space; nucleus lost; soft parts of the subgenus; maximum longitude of shell, 31.5; maximum latitude, 11.5^{mm}.

HAB.—Station 2807, near the Galapagos Islands, Pacific Ocean, in 812 fathoms, mud; temperature 38°.4 F.

This species, though more slender and much more finely striated, recalls the slender varieties of *P. Agassizii*, though altogether destitute of the strong ribbing and sutural plications. None of the *P. Agassizii* have quite such a taper spire, yet in a general way the two forms belong to the same section of the group. Only one living specimen of the *P. suffusa* was obtained.

Subgenus GLYPHOSTOMA Gabb.

Glyphostoma gratula Dall.

G. gratula Dall (1881), *op. cit.*, XVIII, p. 110, Pl. XII, Fig. 10.
Pleurotoma (*Drillia*) *incilis* Watson.

Collected by the *Albatross* at Station 2750, off St. Bartholomew, West Indies, in 496 fathoms, sand; temperature 44°.4 F.

Genus **BORSONIA** Bellardi.

Subgenus CORDIERIA Rouault.

A finely spirally striate, white *Cordieria*, with two plaits, an undulated anterior border to the anal fasciole, the canal long and slender, with a constriction in front of the short body whorl, was collected with the preceding. The last whorl measured 17.5 by 5.5^{mm}. The spire was entirely deficient, so that it can not be described, though the occurrence of the species is worth noting.

Superfamily RHACHIGLOSSA.

Family OLIVIDÆ.

Genus **OLIVELLA** Swainson.

Olivella floralia Duclos.

Collected at Station 2758, 90 miles southeast from Cape San Roque, Brazil, in 20 fathoms.

Olivella jaspidea Gmelin.

Collected at Stations 2764, 2765, and 2766, the southernmost being off the Rio de la Plata and the depths 10 to 12 fathoms.

Olivella bullula Reeve.

Collected at Stations 2754, 2756, and 2768, the southernmost being off Cape Delgado, eastern Patagonia, and the depths varying from 43 to 880 fathoms. The specimen from shallow water was dead.

Genus ANCILLARIA Lamarck.

Ancillaria Tankervillei Swainson.

Young and dead specimens of this species were collected at Stations 2762 and 2764, in 11½ to 52 fathoms, off the coast of Brazil and the Rio de la Plata.

Family MARGINELLIDÆ.

Genus MARGINELLA Lamarck.

Marginella cineracea Dall.

Plate XI, Fig. 6.

M. cineracea Dall, Bull. U. S. Nat. Mus., No. 37, p. 106, No. 298, Pl. 42, Fig. 6, 1889.

Shell thin, opaque, ashy (when living perhaps translucent whitish), oval, smooth, four whorled; spire low, dome-like, not glazed over with callus; suture distinct, not channeled, slightly appressed: surface smooth, marked only by faint incremental lines; body whorl at the aperture thinly glazed but not callous; plaits oblique, distinct, three in number, the posterior weakest, the anterior continuous with the outer lip as it curves around the canal; siphonal fasciole, none; outer lip thin, very slightly reflected at its outer edge and scarcely thickened within, not denticulate; the outer margin of the lip is arched forward and outward; aperture wide, with a shallow anterior sinus and a narrow posterior commissure; maximum longitude of shell 14; maximum latitude 8^{mm}.

HAB.—U. S. Fish Commission Station 2678, in 731 fathoms, ooze, off Cape Fear, North Carolina; bottom temperature 38°.7 F.

This is a remarkably thin, simple, yet elegantly formed species. It is notable, among other things, for having but three plaits, for its absence of callus, and for its perfectly smooth outer lip. I do not recall any species of its own size with which it should be compared. There is a much smaller and probably unnamed species, dredged in deep water in the latitude of Fernandina, Florida, which has a very similar form. The thinness of the shell recalls *M. fauna* Sowerby and *Volvarina pallida*.

All the specimens obtained are of a yellowish ash color, but it is possible that when alive they were more translucent, if not whiter.

Marginella avena Valenciennes.

This species was collected at the Abrolhos Islands, on the Brazilian coast, near Porto Allegre.

Marginella succinea Conrad.

Marginella lactea Kiener.

Persicula catenata Montagu.

The three species above enumerated were obtained at Station 2758, 90 miles southeast from Cape San Roque, Brazil, 419 miles south of the equator, in 20 fathoms, shelly bottom.

Family VOLUTIDÆ.

Genus **SCAPHELLA** Swainson.

Scaphella magellanica Sowerby.

Plate IX, Figs. 5, 6.

Scaphella magellanica Dall, Bull. Mus. Comp. Zoöl., XVIII, p. 452, June, 1889.
Voluta magellanica Sowerby, Thés. Conch., I, 204, Pl. 54, f. 99, 1847; not of Chemnitz, Conch. Cab. X, p. 139, 1788.

HAB.—Straits of Magellan and the eastern coasts of South America north of the Straits to latitude 36° 42′ south; off the Rio de la Plata, in from 10 to 80 fathoms; temperature 42° to 50° F.

In discussing the peculiar nucleus of the shell of *Scaphella* about a year ago, I suggested that the form of the apex indicated the presence in the young larva of a membranous, or at least partly membranous, protoconch to which the normal shell was added and which, after the formation of the normal shell, decayed or was lost. I suggested that the small sharp point characteristic of the tip in certain recent and fossil species of *Scaphella* was probably formed by the deposition of the first shelly matter along the line of the pillar of the membranous larval shell. It was therefore with a great deal of interest that I found in the *Albatross* collection, containing the larval young, several ovicapsules of *Scaphella magellanica* from the coast of Patagonia.

These ovicapsules are circular, about an inch (28^{mm}) in diameter, with a flat base attached to dead Pectens; the upper part consists of a rounded dome, about 12^{mm} high, rather more lenticular than hemispherical, but varying somewhat in different specimens. It is externally exactly like the ovicapsule of *Volutopsis* from Alaska, and, like that, contains two to four surviving larval shells. These remain in the capsule until they have three or four shelly whorls. The apical point is acutely conical, slightly twisted, and in the youngest specimens (two-whorled) still retains some shreds of the extremely fragile membranous protoconch adhering to the first whorl. As suggested by me from a study of the nuclei of *Aurinia*, the pillar of the protoconch and the apical spur of the larval shell coincide. The shape of the protoconch could not be ascertained, but its aperture was probably oval, from its traces left on the shelly surface. The apex is at first very sharp, but it loses substance even in the ovicapsule, and three-whorled specimens had it quite blunted, while shells escaped from the capsule show usually a mammillary tip at all stages. The largest larva obtained, though it had just begun to make part of the shell showing color pattern, was still without cephalic tentacles, eyes, or siphonal appendages. It had no trace of an operculum or epipodium. The shell showed two plaits on the columella. The confirmation of the existence of the suspected protoconch is particularly gratifying. The larval characters emphasize the differences between *Voluta* proper and *Scaphella*, and leave no doubt of the propriety of their generic separation. The turbinate, shelly, peculiarly sculptured larval shell of *Voluta* is entirely different from anything we find in *Scaphella*.

The ovicapsules containing young larvæ were dredged from a depth of about 80 fathoms. The larval shell figured had attained a length of 11^{mm}.

This species, described by Sowerby, is not the *Voluta magellanica*, etc., of Chemnitz, a non binomial author. Chemnitz states in his synonymy that his shell is the *Voluta ancilla* of Solander, in the Catalogue of the Portland Collection; and that he is right is confirmed by his excellent figure, which agree perfectly with Sowerby's figure of *V. ancilla*. Sowerby does not refer to Chemnitz, who, not adopting the Linnean nomenclature, was in no case entitled to priority. The *S. magellanica* is much like the *S. ancilla*, from which it is chiefly distinguished by its smaller size, more slender form, and usually fewer plaits.

Scaphella? brasiliana Solander.

Plate IX, Fig. 2.

The most extraordinary ovicapsule in the *Albatross* collection also belongs to the *Volutidæ*, and after careful study I am disposed to refer it to the species generally known as *Scaphella brasiliana* Solander.

This ovicapsule is oblate-spheroidal in shape, a view from above giving a perfectly circular outline, while from the side the profile is a symmetrical oval. It is yellowish in color but nearly transparent, thin, with a smooth, polished surface like that of wet gelatine, and possesses considerable rigidity. It is sufficiently rigid to retain its form perfectly under considerable pressure, and would probably crush rather than bend to a force too great to be resisted. It was filled with a fluid, probably not very different from sea-water, and contained a single bubble of air, which, by its lightness remaining in the dome of the capsule, just about counterbalanced the weight; so that, without rising to the surface, the capsule would float in the sea at a moderate depth. This novel craft was freighted with the larval shells of some form belonging to the *Volutidæ*, but in which the calcification appears to proceed equally and simultaneously from the peristome of the protoconch, so that the apex, while indicating that a protoconch had existed, did not present a raised point due to calcification alông the columella of that protoconch, as in *Scaphella magellanica*. From careful comparisons, I find the only known species belonging to the region where this ovicapsule was obtained which is not excluded by the character of its nucleus from identification with the larvæ contained therein, is *S. brasiliana*, which has two plaits; and I have little doubt that to that species it should be referred. About twenty-five larval shells were contained in it, each showing two plaits.

This remarkable ovicapsule measures about 55^{mm} in horizontal diameter and 50^{mm} in vertical height. It was collected at U. S. Fish Commission Station 2766, in 10½ fathoms, sand, off the Rio de la Plata, in south latitude 36° 47′ and west longitude 56° 23′. Its specific gravity is almost equal to that of the alcohol in which it is preserved, and consequently it is somewhat lighter than sea-water. Whatever may have been its original condition, the contained air bubble would have made it practically lighter than the water around it, though very slightly so.

According to H. & A. Adams, in the Genera of Recent Mollusca, Orbigny states that "the ovicapsule of *S. brasiliana* is 3 inches in length." As I am unable to refer to Orbigny's work and thus determine how certainly the ovicapsule he refers to was identified with its parent, the question remains doubtful how far it is to be depended upon. It would seem singular to call a circular hemispherical capsule, like that of *Scaphella*, "long," and that adjective would indicate some error of identification. However that may be, if the present ovicapsule, undoubtedly belonging to the *Volutidæ*, does not come from *S. brasiliana*, I am entirely at a loss to conjecture to what mollusk of this region it can be referred.

Genus **VOLUTILITHES** Swainson.

This genus is the Eocene parent of the recent genera of the *Volutidæ*. The *V. abyssicola* Adams & Reeve is not a typical species, but belongs to a small subsidiary group, having a dentate outer lip. The type of *Volutilithes* is the *Voluta spinosa* of Lamarck.

Volutilithes Philippiana sp. nov.

Plate IX, Fig. 4.

Shell (not fully adult) small, elongated, fusiform; color rather dark olivaceous-ash color with a pale band in front of the suture; nucleus superficially eroded, small, apparently not mammillate or inflated when perfect; whorls six, when adult probably with one or two more, appressed at the suture, somewhat constricted in front of it; sculpture of rounded grooves, coarser on the constricted band in front of the suture, finer and almost linear anteriorly on the last whorl, and slightly coarser again on the canal; the interspaces are flattened, narrow, but always wider than the grooves; there are also some fine, irregularly distributed spiral striæ; transverse sculpture of numerous little elevated, narrow, slightly flexuous waves, which on the penultimate whorl extend from the suture back to the constricted part, where they become obsolete; on the last whorl they are more irregular, fainter, and barely pass the periphery; in a perfectly adult shell they would probably be obsolete on the last whorl; these waves average somewhat less than two millimeters from crest to crest at their most prominent part a little behind the periphery on the earlier whorls; the lines of growth are fine, regular, distinct under a lens and minutely decussate the spirals; aperture narrow, pointed behind, rather wide in front, with no constriction for the canal; outer lip thin, slightly receding near the suture, not lirate within; inner lip slightly excavated, white, with a polished film of glaze over the part from which the limy layer has been absorbed; pillar thin, sharp, nearly straight; canal wide, not differentiated; there is a single prominent, fine, sharp plait just behind the edge of the pillar, and a little further back two smaller subequal plaits closer to each other than the anterior one of the pair is to the larger anterior plait; all are very oblique. Longitude of shell, 36.5; maximum latitude, 14.5; longitude of aperture, 19.5^{mm}.

HAB.—Station 2791, in south latitude 38° 08′, and west longitude 75° 53′, off the southwest coast of Chili, in 677 fathoms, mud; bottom temperature 37°.9 F.

This unique shell belongs to a group of which the other known representatives appear to be extinct. *V. D'Orbignyana*, *V. Domeykoana* and *V. gracilis* Philippi, *V. indurata* Conrad as well as *V. triplicata* Sowerby, all from the tertiary strata of Chili and the western coast of America, are members of it. The *Voluta gracilis* (Philippi, 1887; not of Lea, 1833, or Swainson, 1842) is perhaps its nearest relative, and probably in a large series would prove to be hardly specifically distinct. The name *gracilis* being several times preoccupied, I have therefore applied the name *Philippiana* to the present species, so that if future researches should indicate it to be identical with the tertiary fossil the name will extend to that also. It is intended as a slight compliment to Dr. Philippi, of Santiago, whose labors for nearly three quarters of a century have so much ameliorated malacology.

The west American tertiary group in question may turn out to be, as a whole, equivalent to but one species, in which case *V. triplicata* of Sowerby was first described. But until I have seen specimens of the various named forms, I would lay no stress on this observation suggested by the rather indifferent figures. The present species appears, more nearly than any other recent form, to represent the typical *Volutilithes*, while the *V. abyssicola* is shown by Mr. Watson, from the adult *Challenger* specimens, to be more nearly related to *Lioderma* Conrad.

V. Philippiana and its fossil precursors represent a step in the line of descent from the Cretaceous forms of *Volutidæ* toward *Scaphella* and *Aurinia* as well as *Voluta* proper. *Scaphella* is probably descended from older representatives of the present group, while *Voluta* proper came through the line of forms like *Lyria*, so abundant in the Eocene. It is true that the present species is not spinose at the shoulder like the types of the genus, but even those are frequently smooth, and the Chilian and Oregonian fossils are frequently nodose and almost spiny at the shoulder.

The soft parts of this species were preserved. The exterior of the body is of a yellowish color and, as contracted in alcohol, rather rugose; the foot is moderately pointed behind, in front auriculated at the corners and double-edged; there is no operculum or rudiment of an opercular gland; the head is wide, with rather long, rounded, moderately stout tentacles with an expansion at the outer bases, but no eyes in the specimen before me. The siphon is long and has an appendix near its base on each side of the gutter; the gill and osphradium are as usual; the anus is simple, not free or prominent; near it are a purpuriferous and a large slime-gland, on the dome of the mantle; the verge is small, clavate, with a smaller conical tip, not flattened, about as long as one of the tentacles but thicker. It is situated immediately behind the right tentacle.

The characters of the group as far as can be judged from present data are as follows: Shell transversely ribbed and spirally striated; nucleus minute, not conspicuously differentiated from the immediately succeeding whorls; plaits few, moderate, oblique; animal devoid of an operculum and blind.

Scaphella proper has a membranous larval shell and a styliferous nucleus, and the surface of the adult is usually smooth; ***Fulgoraria*** has a similar or at least a swollen mammillary nucleus and spirally striated and ribbed whorls with strong plaits.

A careful study of the nuclei in well preserved recent and fossil *Volutidæ* will do much toward elucidating the relations of its subordinate groups. In my report on the Floridian Pliocene, a beginning has been made in this direction. The present species came in very opportunely to assist in determining the characters of the soft parts. An empty ovicapsule dredged with it resembles those of *Scaphella magellanica*, but was only about 10^{mm} in diameter at the base.

Family MITRIDÆ.

Genus **MITRA** Lamarck.

Mitra Bairdii Dall.

Plate XI, Fig. 7.

Mitra (*Turris?*) *Bairdii* Dall, Bull. Mus. Comp. Zoöl., XVIII, p. 161, June, 1889.

Shell waxen gray or greenish, elongated, acute, with ten or eleven flattened whorls; nucleus ? (wanting); sculpture consisting on the earlier whorls of up to fourteen little raised hardly flexuous transverse waves extending clear across the whorls, rounded, equal throughout their length, and separated by shallow slightly wider interspaces; this transverse sculpture becomes gradually fainter, and entirely obsolete on the last whorl, which in the adult seems only marked by the fine and slightly irregular incremental lines which give to the thin, smooth, pale brown, and slightly fibrous epidermis a silky appearance; spiral sculpture of numerous very fine, close, half obsolete grooves or scratches, and six or seven deeper, stronger grooves encircling the canal; whorls mostly flattened, the last slightly rounded; suture distinct, appressed; aperture white, the outer lip thin, sharp, with no liræ in the typical specimen; column with three plaits, the anterior one faint; canal short, nearly as wide as the aperture, hardly recurved; siphonal fasciole distinct; soft parts whitish, with no operculum. Longitude of shell (nuclear whorls lost), 35; of last whorls, 17; of aperture, 12; maximum latitude of shell, 9^{mm}.

HAB.—One living specimen, at Station 2628, 100 miles southeast by south half south from Cape Fear, North Carolina, in 528 fathoms, yellow mud; bottom temperature 38°.7 F.

The soft parts are so contracted that they could not be extracted without breaking the shell. This species looks a good deal like a *Terebra* in form. None of the described species at all resemble it.

Mitra Hanleyi Dohrn.

This species was dredged in 20 fathoms, 90 miles southeast from Cape San Roque, Brazil, at Station 2758.

Subgenus CONOMITRA Conrad.

Conomitra intermedia sp. nov.

Plate v, Fig. 3.

Shell elongated, white, polished, fusiform, with a large smooth shelly nucleus and seven or more whorls; suture distinct, not channeled; whorls with a slight shoulder a short distance in front of the suture, on which are a series of short, narrow, irregularly spaced little-elevated riblets, which, except on the earliest whorls, become almost immediately obsolete; other transverse sculpture only of incremental lines; spiral sculpture of microscopic spiral striæ, often obsolete, and a few fine faint threads on the canal; aperture narrow, elongated; outer lip (broken) thin, not internally lirate; pillar and body with a thin glaze of polished enamel; plaits four, very horizontal, the posterior the highest; pillar straight, attenuated in front; canal short, hardly differentiated from the aperture; maximum altitude of shell, 15.5; maximum latitude, 5.7^{mm}.

HAB.—U. S. Fish Commission Station 2750, off St. Bartholomew, West Indies, in 496 fathoms, sand; bottom temperature 44°.4 F.

This curious little shell very nearly bridges the gap between *Conomitra* and *Mitra*. The large inflated nucleus is a common characteristic of deep water species of many diverse groups; the typical *Conomitra* has a small but also rather bulbous nucleus. It is possible that the whiteness of this shell is due to its dead condition, but it has the unmistakable abyssal facies and is probably colorless in life. Only two dead specimens, one a mere fragment, were obtained.

Family FASCIOLARIIDÆ.

Genus **FASCIOLARIA** Lamarck.

Subgenus MESORHYTIS Meek.

Mesorhytis costatus sp. nov.

Plate v, Fig. 5.

Shell small, thin, slender, the axis slightly bent, of a pale cinereous or buff color, with six or seven whorls; nucleus large for the size of the shell, rather inflated and loosely coiled, polished white; spiral sculpture on the early whorls from four to six little-elevated flattish threads with subequal interspaces; between the suture and the periphery on the later whorls these spirals disappear but persist on the periphery and between it and the succeeding suture or the end of the canal; on the last whorl these threads become faint or obsolete, but on the preceding whorls do not enlarge in crossing the ribs; transverse sculpture on the earlier (except the first two) whorls, of eight to eleven rather stout narrow ribs or costæ, extending from a little in front of the suture over the periphery, where they are strongest, to the next suture, and overrun but not nodulated by the spirals; on the last whorl the transverse as well as the spiral sculpture becomes obsolete; suture distinct, somewhat appressed; whorls moderately rounded; canal slender, slightly tortuous and distinctly recurved; aperture elongate, pointed before and behind, the canal distinct; outer lip thin, simple, not internally lirate; pillar slender, twisted, with a thin glaze; one shorter anterior and two posterior strong transverse plaits. Maximum longitude of shell, 14; maximum latitude of shell, 4^{mm}.

HAB.—U. S. Fish Commission Station 2751, south of St. Kitts, West Indies, in north latitude 16° 54′ and west longitude 63° 12′, in 687 fathoms, globigerina ooze; bottom temperature 39°.9 F.

This species, like *M. Meekii* Dall, was taken without the soft parts. It is a minute fusiform *Fasciolaria* with the transverse plaits of a *Mitra*. In *Ptychatractus*, which seems to be its northern representative, the plaits resemble those of *Fasciolaria* and not those of *Mitra*. The group was first differentiated by Meek as a Cretaceous fossil. Both the recent species inhabit the deep waters of the Antilles. A fragment of still another species, or a *Cordieria*, insufficient for description but evidently new, was dredged in 496 fathoms, at Station 2750, near St. Bartholomew, West Indies.

Genus **LATIRUS** Montfort.

Subgenus LEUCOZONIA Gray.

Leucozonia cingulifera Lamarck.

Leucozonia ocellata Gmelin.

These two species were collected at the Abrolhos Islands, near Porto Allegre, Brazil.

Genus **FUSUS** Lamarck.

Fusus ceramidus Dall.

Plate VI, Fig. 6.

Fusus ceramidus Dall, Bull. Mus. Comp. Zoöl. XVIII, p. 171, June, 1889.

Shell of a waxen or brownish yellow color, of a peculiar waxen subtranslucency, nine-whorled, strongly transversely ribbed, with obscure spiral sculpture, and an imbricated band in front of the suture. Nucleus white, smooth, small but swollen. Transverse sculpture of seven or eight rounded ribs, stouter and more prominent on the early whorls, and on most of them not quite reaching the suture; also sharpish lines of growth which in front of the suture are elevated into flattish, somewhat irregular imbricated scales, forming a narrow band in front of the suture. Spiral sculpture of primary and finer secondary threads, one or two of the former near the periphery becoming sharper and more prominent as they pass over the ribs; on the later whorls all the spiral sculpture has a worn or partially obsolete appearance. Aperture large, canal moderate, curved to the left; outer lip not much thickened, internally lirate; a callous ridge on the body, near the outer lip; the inner lip smooth, or with a few liræ near the canal. Maximum longitude of shell, 46.5; of last whorl, 32; of aperture and canal, 26; maximum latitude of shell, 18.7^{mm}.

HAB.—Near Barbados, in 73 to 103 fathoms, sand; bottom temperature 60° to 71° F.

Fusus æpynotus Dall.

Plate VII, Fig 5.

Fusus æpynotus Dall, Bull. Mus. Comp. Zoöl., XVIII, p. 169, June, 1889.

Shell small, slender, white, eight-whorled; nucleus milk-white, strongly transversely plicate below, above smooth, rounded; spiral sculpture of (on the last whorl eighteen) strong rounded threads of which four or five are visible on the upper whorls; these are slightly swollen, but not keeled, where they pass over the ribs; between these are numerous fine close-set threads slightly marked by inconspicuous lines of growth. The transverse sculpture consists of (on the last whorl ten) rounded, rather close, stout ribs, which pass clear over the whorl and are straight and slightly larger behind; suture appressed and wavy, conspicuous; canal stout, slightly twisted, aperture subovate, marginated: outer lip internally lirate with two or three strong denticles anteriorly; inner lip smooth, or slightly granulous. Maximum longitude of shell, 24; of last whorl, 16.5; of aperture and canal, 12.5; maximum latitude of shell, 9^{mm}.

HAB.—U. S. Fish Commission Station 2648, off Cape Florida, in 84 fathoms, green mud; also at *Blake* Station 36, in 84 fathoms, Gulf of Mexico; off Sombrero, in 70 fathoms.

This species recalls *F. Bocagei* Fischer, dredged by the *Travailleur* in about 500 fathoms; but that species, from an authentic specimen, is shorter, stouter, with only seven transverse ribs and three principal spiral threads on the spire. The fine spirals in *F. Bocagei* are also more conspicuous. *F. æpynotus* has a little the aspect of *Fusus carolinensis* Verrill, especially the young ones, while differing in many details, especially the number and straightness of the ribs. Its nearest relative would seem to be a form named by Borson *Fusus lamellosus*, from the Tertiary of Modena; but this is merely the young of *F. rostratus*, and the adult has very different characters.

Fusus alcimus Dall.

Plate VII, Fig. 6.

Fusus alcimus Dall, Bull. Mus. Comp. Zoöl., XVIII, p. 170, June, 1889.

Shell resembling *F. æpynotus*, but shorter and more acute at both ends, with only six much more oblique and proportionally stouter ribs, coarser revolving spirals, and none of the fine spiral striation which exists between the primary threads of *F. æpynotus*. It has eight whorls; the nucleus is strongly plicate below; the interspaces between the ribs are deep, and in them the spirals are much closer together than they are on the summit of the ribs; on the last whorl there is sometimes an intercalary single fine spiral thread. The color is yellowish, with touches of dark brown; the canal is very short; the aperture is contracted, the lips much thickened, the outer one strongly internally lirate, the inner one smooth; the suture is inconspicuous and very much waved; maximum longitude of shell, 15; of last whorl, 9.2; of aperture and canal, 7; maximum latitude of shell, 7^{mm}.

HAB.—Gulf of Mexico, in 95 fathoms, 100 miles north of Yucatan.

Fusus alcimus var. **Rushii** Dall.

Fusus (*alcimus* var.?) *rushii* Dall, *op. cit.*, p. 170, 1889.

Shell smaller, pure white, nucleus hardly plicate, depressions between the ribs less deep, ribs less prominent and hardly oblique. Longitude 8.5; latitude, 4^{mm}.

HAB.—West of North Bemini, Bahamas, in 200 fathoms; Dr. Rush.

FAMILY BUCCINIDÆ.

Genus **BUCCINUM** Linné.

Buccinum viridum sp. nov.

Plate VI, Fig. 9.

Shell delicate, thin, inflated, six-whorled, with a delicate greenish gray, slightly fringed, dehiscent epidermis; spiral sculpture of numerous subequal flattish threads, with narrower rounded interspaces and no intercalary threads; these threads are, as usual, slightly coarser on the base and finer behind the shoulder of the whorl near the suture; at the shoulder a single more prominent but not much larger thread slightly turriculates the spire; whorls full and rounded, especially on the base; suture distinct but not channeled; aperture wide, outer lip somewhat patulous in front, receding toward the suture; canal wide, short, hardly discriminated from the aperture, very slightly recurved; fasciole distinct but not prominent; pillar thin, twisted; inner lip smooth, white, slightly excavated, or the limy outer layer of the shell is there absorbed and the space covered with a thin wash of polished glaze; except for the epidermis the shell is pure white. The outer lip is very thin and but slightly reflected. The nucleus is eroded on the surface so that its character is not determinable. Maximum longitude of shell, 46; of aperture, 24; maximum latitude of shell, 29^{mm}.

HAB.—Station 2839, off Santa Barbara Islands, California, in 414 fathoms, sand.

The operculum is oval, slightly pointed towards the extremities, thin and normal, the nucleus being near the margin about three-eighths of the distance from one end toward the other. The soft parts are whitish, the tentacles moderate, the swelling for the eye present, but usually unpigmented, though a trace of the color seems to remain in some specimens. The gills and osphradium are as usual. The verge is as long as the foot, stout, geniculate, razor-blade shaped, the thin edge being to the right or when recurved and turned under, as is generally the case, to the left; the distal end is squarish, rounded at the corners, the thicker angle terminating with a small acorn-shaped papilla. The dentition recalls that of *B. undatum*, but the central tooth has five sharp, spike-shaped, subequal denticles, the two inner cusps of the laterals, while smaller than the outer cusp, are more nearly its size, the middle one of the three tends to be smaller and to have one or even two minute denticles, one on each side in the latter case, near its base. The formula would be $\frac{1}{3}\cdot\frac{1}{5}\cdot\frac{1}{3}$ and the full formula of a fully developed lateral would be $\frac{1}{1+\frac{1}{3}\cdot 1}$. None of the specimens were fully mature, though the one figured had formed the beginning of the reflected lip, so that its shape could be ascertained; but it is probable that fully mature specimens would have the reflection wider and stronger.

Genus **CHRYSODOMUS** Swainson.

Chrysodomus amiantus sp. nov.

Plate v, Fig. 10.

Shell large, thin, white, with six whorls and a small but prominent inflated subglobular nucleus; spiral sculpture of numerous close-set rounded narrow ridges, of which part are larger than the others; on the early whorls two or three of the primaries are conspicuous on the periphery, with one or two finer ones intercalated; later the peripheral spirals merge with the other primaries, as to size and prominence, and on the last whorl there are four or five intercalary threads between the primaries, the space between the latter, from center to center, averaging 2.5^{mm} to each set; transverse sculpture shows only in fine, slightly irregular lines of growth; the whorls from and including the third are inflated, and the suture, though not channeled, is strongly marked; the canal is short and recurved, the siphonal fasciole indistinct; the aperture is wide, the outer lip, prominent in the middle, receding toward the suture and the canal, smooth not thickened, whitish internally; inner lip concave, with a thin glaze of polished callus, slightly brown tinted; pillar twisted and the axis minutely pervious; the aperture longer than half the shell; operculum brown, moderately stout, apically pointed; maximum longitude of shell, 76; maximum latitude, 43; longitude of aperture, 45^{mm}.

HAB.—Station 2839, near the Santa Barbara Islands, off the coast of California, in 414 fathoms, sand; bottom temperature not taken.

This fine species does not require any comparisons to indicate its distinctness from forms already known. Several specimens of different ages were obtained, all the adults showing more or less strongly the effect of carbonic acid or other eroding agency on the upper whorls, though living when obtained.

The soft parts are whitish externally. The foot double-edged in front, but not auriculate, the tail-end gently rounded; the tentacles, as contracted in alcohol, are subtriangular and somewhat flattened; there is no pigmented organ of vision nor any distinct vestige of such an organ without pigment. The gills and osphradium are as usual; also the female muciparous gland, which furnishes the material for the ovicapsules; the vent projects slightly, but is not free; the penis is not remarkably large, but is geniculate as usual, its front edge thick and rounded, its hinder edge sharp and transversely wrinkled, slightly projecting distally behind a stout, short, conical papilla. The male, as usual, is smaller than the females. The dentition resembles that of *Chrysodomus despectus*, as figured by Friele (Moll. Norske Nordh. Exp., I, Pl. IV, Fig. 9), or even more that of *C. latericeus* (*op. cit.*, Pl. VI, Fig. 16), from which it differs by the outer denticle of the laterals being proportionately a little longer, and the three denticles of the rhachidian being more slender, close-set, and longer in proportion to the base; the base itself is of a yellow-brown tinge; the laterals and the cusps of the median teeth are of the usual pale-amber color.

I do not remember to have seen attention called to the very general dark color of the "false" or "supplementary gill," or osphradium, as compared with the other soft parts. It is always darker than the true gill; the latter is usually darker than the general surface of the mantle, though not so dark as the substance of the liver.

Chrysodomus griseus sp. nov.

Plate v, Fig. 6.

Shell thin, solid, rather acutely pointed when perfect, but almost invariably eroded at the tip, eight whorled, covered with an olive gray epidermis, the substratum, pillar, throat, and reflected lip milk-white; nucleus eroded, small; suture distinct, not appressed or channeled; whorls full and rounded; transverse sculpture of twenty to twenty-five, narrow somewhat irregular arcuated wave-like ribs, which on the earlier whorls often reach from suture to suture but are strongest on the periphery; some specimens have them faint, others the majority have them strong, but in all they become more or less obsolete on the last whorl; spiral sculpture of rather coarse, rounded, not much elevated cinguli, with narrow interspaces, slightly reticulated by the incremental lines; variable in strength but usually covering the whole surface; in five young specimens the surface over the sculpture is somewhat polished, in adults it has a more rude appearance; aperture oval, wide; the outer lip flexuous as in *Buccinum*, more or less (in some specimens very much) reflected; margin simple, smooth; body polished, the surface slightly excavated and glazed; pillar thin, simple, twisted; the axis widely pervious in the young, minutely or not at all in the adult; canal short, wide, slightly recurved; there is no siphonal fasciole; operculum large, thin, ovoid, slightly curved, with an apical nucleus. Maximum longitude of shell, 32; maximum latitude, 18^{mm}.

HAB.—U. S. Fish Commission Station 2839, near the islands off Santa Barbara, California, in 414 fathoms, grey sand; temperature not recorded.

Animal whitish, with a little gray about the head and tentacles. General form and details as in *C. amiantus*, except that the tentacles are longer and more cylindrical and the verge is proportionately larger, more cylindrical, with the termination swollen, slightly hood-shaped, with a granular depressed oval area set obliquely at one side and no visible terminal papilla. I am uncertain how much of the difference noted in this organ between different species is due to its different degrees of extension when placed in alcohol and differences in contraction taking place under the influence of alcohol.

The dentition agrees with that of *C. amiantus*, but is of course on a much smaller scale. The sexual differences in *C. griseus* are less than in the previous species, the females being generally somewhat more robust and having the concave wave in the outer lip somewhat more pronounced. The operculum of the extremely young is buccinoid, but this character is lost very early. Perhaps this may be found to be the case throughout the genus.

Chrysodomus aphelus sp. nov.

Plate VI, Fig. 7.

Shell small, bucciniform, six-whorled, smooth, covered with a greenish-gray epidermis; nucleus minute, eroded; whorls full, well rounded; suture distinct, not deep nor channeled; sculpture only of faint incremental lines and a few obscure spiral traces; aperture moderate, the outer lip thin, very slightly reflected, flexuous; body and pillar lips white, polished, without callus; pillar short, strong, curved, obliquely truncate anteriorly, well recurved; canal short, wide, well defined, and recurved; throat smooth, white; axis not pervious; operculum normal. Maximum longitude of shell, 30; maximum latitude, 15^{mm}.

HAB.—Station 2839, in 414 fathoms, off the coast of Santa Barbara county, California.

The soft parts of this species agree with those of the preceding, *C. griseus*, except that in the sole male specimen a blunt papilla protrudes from the oval depressed area at the end of the verge, and a little more than one-fourth the way from the external bases of the tentacles toward their tips are situated eyes of unusual size and blackness. The dentition does not differ from that of *C. griseus*. Here we have the interesting fact of two species of the same group, nearly related, from the same identical spot in the archibenthal region of the Pacific, in one of which the environment has induced blindness, while in the other the eyes have been retained and become larger, and in all probability more sensitive. This seems to me to indicate the existence of a certain amount of light on the sea bottom at over 400 fathoms.

This modest little shell presents few salient characters, but its very simplicity is notable and attractive. With the preceding species it belongs to a peculiarly bucciniform group, which are characterized by a strongly reflected lip, short canal, and minute nucleus in the shell, but which, so far as the soft parts are concerned, present no obvious points of difference having systematic value from the larger and, so far as the shell is concerned, more normal species from shallow water.

Subgenus SIPHO Mörch.

Chrysodomus (Sipho) Rushii Dall.

Plate V, Fig. 1.

Chrysodomus (*Sipho*) *Rushii* Dall, Bull. Mus. Comp. Zoöl., XVIII, p. 175, June, 1889.

Shell small, thin, white, elongated, with a furfurescent epidermis and six whorls. Nucleus regular, white, smooth, but becoming gradually spirally striate; whorls well rounded; suture distinct; spiral sculpture of (between the sutures five) primary threads, with a smaller thread in the intervals and finer ones on the anterior part of the last whorl and canal; these are crossed by fine flexuous lines of growth which decussate the threads, or give them, in strongly sculptured specimens, a somewhat beaded look; there are also twelve to fifteen faint flexuous ribs crossing the whorl, tending to become obsolete on the last half of the last whorl, and more marked on some specimens than on others; these are quite concave at and behind the periphery; canal short, narrow, twisted to the left; columella rather concave; aperture entirely simple, with no visible callus; operculum rather wide and short. Maximum longitude of shell, 11; of last whorl, 7.5; of aperture and canal, 5.5; maximum latitude of shell, 4.5; of aperture, 1.25^{mm}.

HAB.—Station 2644, off Cape Florida, in 193 fathoms, sand; bottom temperature 43°.4 F.; Station 2668, off Fernandina, in 294 fathoms; also in 205 fathoms, off Fowey Rocks, in the Straits of Florida; by Dr. W. H. Rush, U. S. Navy.

This is a delicate and pretty little shell, which is, in its general characters, very much like the young state of *Tritonidea limbata* Philippi (+ *Fusus pulchellus* Pfr. non Phil.); but that is more strongly sculptured and has a different nucleus, beside being clouded with color.

Chrysodomus (Sipho) testudinis sp. nov.

Shell short, stout, white, with five or more whorls; apex eroded; the last two whorls show about fifteen short, stout, transverse ribs, which do not reach the suture and become obsolete a little in front of the periphery; they are most prominent at the shoulder of the whorl; behind them there is a moderate constriction and the whorl is strongly appressed in front of the suture; beside the ribs, the transverse sculpture consists of irregular, strong, incremental lines; spiral sculpture of numerous coarse, close-set, rounded threads, mostly alternating larger and smaller or more and less prominent near the suture; these are a little granulated by the incremental lines; there is a thin, pale yellow-hispid epidermis; aperture elongate, outer lip slightly thickened with a band of livid pink just inside the sharp simple margin; body and pillar with a solid, also slightly pinkish, callus; pillar a little tortuous, attenuated in front; canal rather short and wide, somewhat recurved, not well differentiated from the rest of the aperture. Maximum longitude of (decollate) shell, 30; of last whorl, 22.5; of aperture, 18; diameter, 15^{mm}.

HAB.—Station 2807, in 812 fathoms, ooze, near the Galapagos Islands, Pacific Ocean; temperature 38°.4 F.

This is a very strongly marked species, but the specimens were greatly eroded and none showed the nuclear whorls or the sculpture on the canal or near the apex.

It has the presutural channel of some of the pleurotomoid forms, but there is no notch or fasciole. The soft parts are as usual; the animal possessed small pigmented eyes and the operculum offered no peculiarities. I do not know any species which greatly resembles it.

Genus **PISANIA** Bivona.

Pisania pusio Linné.

This species was abundantly collected at the Abrolhos Islands, Brazil.

Genus **ENGINA** Gray.

Engina turbinella Kiener.

Collected at the Abrolhos Islands.

Genus **NASSARIA** Link.

Subgenus NASSARINA Dall.

Nassarina columbellata Dall.

Plate VI, Fig. 8.

Nassarina columbellata Dall, Bull. Mus. Comp. Zoöl., XVIII, p. 182, June, 1889.

Shell pure white, attenuated anteriorly, rather acutely conical behind, with eight whorls. Nucleus two-whorled, polished, smooth, milk-white, rather large; spire flatly conical, with a conspicuous suture; upper whorls with about five strong, close-set, equal threads, most conspicuous in the interspaces between the numerous (on the last whorl eighteen) flattened transverse ribs, which cross the whorls but stop short before the sutures, giving a grooved aspect to the latter, which is increased by the existence of a peripheral line or space, wider than any of the others, between the two spirals nearest the periphery; last whorl attenuated toward the long canal, but not constricted, as in *N. Bushii* Dall; aperture long, narrow, contracted, with an elevated continuous margin, interrupted only by the canal, which is recurved near its termination; outer lip with four or five internal teeth; inner lip with five or six finer, smaller ones; whorls not rounded above. Maximum longitude of shell, 12.2; of last whorl, 8; of aperture, 6; maximum latitude of shell, 4.5^{mm}.

HAB.—U. S. Fish Commission Station 2367, off Cape Catoche, Yucatan, in 124 fathoms, sand.

The upper whorls of this shell are flattened and sculptured much like those of *Columbella similis* or *translirata*. The species of this group seem to bear much the same sort of a relation to *Nassaria* proper as *Strombina* does to the typical *Columbella*.

Family NASSIDÆ.

Genus **NASSA** Lamarck.

Nassa scissurata Dall.

Plate v, Fig. 2.

Nassa scissurata Dall, Bull. Mus. Comp. Zoöl., XVIII, p. 185, 1889.

Shell short, conical, glistening, white, clouded with light brown or buff; whorls stout, well rounded; nucleus of two translucent turns, smooth, or transversely slightly wrinkled; remainder, comprising five or six turns, separated by a deep but not channeled suture; sculpture of (on the last whorl about fourteen) stout, rounded ribs, with wider interspaces, completely crossing the whorls, and fine incremental striæ; spiral sculpture of (on the last whorl about ten) revolving ridges, faint in the interspaces, strongly ovally noduled on the ribs, three rows showing on the upper whorls; ribs interlocking at the sutures; aperture rounded, with its edge continuous and raised, contracted in front of a stout varix, lirate on both sides; a stout tooth on the body and another at the base of the pillar; a deep groove behind the siphonal fasciole; canal short, strongly twisted; operculum serrate at the sides. Longitude of shell, 12; of last whorl, 8; of aperture, 5; maximum latitude of shell, 7.5^{mm}.

HAB.—The Antilles and Gulf of Mexico, in 76 to 805 fathoms, rocky bottom; bottom temperature 58°.5 to 65° F.

This species is clearly distinguished from *N. **Hotessieri***, which is its nearest relative, by the character of the sutures, which are not channeled, by its fewer strongly nodulated ribs, and by the curve of the ribs, which in ***Hotessieri***, as in most ribbed univalves, are convex forward on the periphery, and then curve a little backward, while in *N. scissurata* the curve is in a contrary sense, as is at once evident on comparing two specimens. The total curve is not great, but quite sufficient to form a marked distinction.

This species has the bright waxen luster of a deep-water shell, and probably lives in between 75 and 200 fathoms depth. Its sculpture recalls that of *N. spinulosa* Phil.

Nassa Townsendi sp. nov.

Plate XII, Fig. 9.

Shell small, short, very stout, yellowish white, with six whorls; nucleus eroded; transverse sculpture of about sixteen narrow, rounded, low riblets, which extend from suture to suture, but on the last whorl fade away in front of the periphery; the interspaces are nearly twice as wide as the ribs, which in front of the suture have two or three small, prominent nodules coronating the whorls, caused by the intersection of as many spiral threads, which, however, are faint or obsolete in the interspaces; incremental lines not prominent; spiral sculpture of (in addition to the presutural threads above mentioned) numerous rather faint threads on the base of the last whorl and on the canal; surface somewhat polished with a very thin epidermis; aperture short, wide, with a thin, simple outer lip, perhaps thickened later; no internal liræ; inner lip with a smooth, moderately thick, white callus; canal very short and slightly recurved; edge of the pillar raised and sharp. Maximum longitude of shell (without nuclear whorls), 10; diameter, 6^{mm}.

HAB.—Station 2807, near the Galapagos Islands, in 812 fathoms, ooze; temperature 38°.4 F.

This species is nearest to *N. babylonica* Watson, from near the Philippine Islands, and like that has a chrysodomoid operculum. It is, however, stouter, with a proportionately shorter spire, compared with the last whorl, and is more inflated. The operculum is also more elongated.

This species is named in honor of Mr. C. H. Townsend, of the U. S. Fish Commission, one of the naturalists connected with the *Albatross* in her later explorations.

Family COLUMBELLIDÆ.

Genus **COLUMBELLA** Lamarck.

Section ASTYRIS H. & A. Adams.

Columbella permodesta sp. nov.

Plate v, Fig. 4.

Shell small, thin, polished, with five rounded whorls, a pale yellowish epidermis covering a bluish white substratum; transverse sculpture only of faint incremental lines; spiral sculpture of fine spiral threads on the base of the shell, obsolete or absent between the sutures; aperture wide, oval; outer lip thin, simple, very slightly reflected; axis pervious; canal wide, extremely short, hardly differentiated; pillar smooth, twisted, not callous; suture distinct, not appressed or channeled; nucleus rounded, slightly flattened, generally eroded. Maximum longitude of shell, 14; maximum latitude, 7^{mm}.

HAB.—Station 2840, off the Santa Barbara Islands, California, in 276 fathoms, mud.

The soft parts of this animal are of a greenish white color. The foot is unusually long, narrow, pointed behind, double-edged, truncate, and distinctly auriculate in front. The tentacles are very short, stout, blunt, and stand straight forward with a notch between them rather than laterally from the head; the basal part is swollen outwardly and there are pigmented eyes, but so hidden beneath the cuticle as to be readily overlooked when the latter is rendered opaque by alcohol. The sides of the foot are smooth, they are marginated below as in *Limax*, so that the sole is distinctly marked off from the upper surface. The whole animal exudes an abundant mucus. The proboscis is stout, its opening notched below. The gills are rather large, but otherwise as usual. The osphradium also presents nothing unusual. The verge is extremely long, slender, nearly cylindrical, situated on the right side a little distance behind the right tentacle; as contracted in alcohol it was about 7^{mm} in length, tapering gently to a subconical point, without papillæ or appendages of any sort. The dentition resembles that of *C. Hölbollii* as figured by Lovèn, and the species evidently belongs to the same section of the genus, though with a more buccinoid shell than any of the others. The median tooth is a wide, flat, arcuate, edentulous plate without anything resembling a cusp. The laterals have the usual form and two rather rounded denticles near the tip.

The operculum recalls that of *Nassa*, but is rounded at the corners with an entire edge, the nucleus within the margin at the smaller end and a lunate ridge of yellowish translucent callus bounding the scar internally.

A large number of specimens of this species were taken, living at the locality indicated. All were more or less eroded at the tip and were incrusted with a scaly combination of calcareous matter and iron of a rusty color.

Section COLUMBELLA s. s.

Columbella mercatoria Lamarck.

Collected at the Abrolhos Islands.

Section ANACHIS Adams.

Columbella Saintpairiana Caillet.

Collected at Station 2765, off the Rio de la Plata, in 10½ fathoms, sand.

Columbella Verrillii Dall.

C. (*Astyris?*) *Verrillii* Dall, Bull. Mus. Comp. Zoöl., XVIII, p. 192, Pl. XIX, Fig. 8.

Collected at Station 2756, in 391 fathoms, sand, off the Para River, Brazil.

Section NITIDELLA Swainson.

Columbella moleculina Duclos.

Collected at Stations 2764 and 2765, off the Rio de la Plata, in 10½ fathoms, sand.

Subgenus AESOPUS Gould.

Aesopus Metcalfei (Reeve) Dall.

Aesopus Metcalfei Dall, *op. cit.*, XVIII, p. 194, 1889.
Terebra Metcalfei Reeve.

Collected at Station 2761, off the Rio de la Plata, in 10½ fathoms, sand. It was previously known from Santo Domingo.

Family MURICIDÆ.

Subfamily MURICINÆ.

Genus **MUREX** Linné.

Murex (Chicoreus) Leeanus sp. nov.

Plate VII, Fig. 1.

Shell strong, stout, pale yellowish brown, with three varices to each whorl, and a faint intervarical node between each pair of varices; the varices toward the apex fall slightly short of completing a whole whorl, so that they are slightly spirally arranged; the deficit on the whole shell of six and a half whorls (excluding the nucleus) is about one-quarter of a turn, so that the great varical spines on the spire are not directly over one another; nucleus minute (lost in the specimen); first whorl or two with eight or ten small spiny or scaly nodes; at the third whorl the spines begin to take on the characteristic trialate arrangement; spiral sculpture of rather fine, rounded threads, almost uniformly distributed, slightly coarser in front of the periphery and on the varices, and in front of the suture for a short distance nearly obsolete; the interspaces are narrow grooves, with very rarely an intercalary thread; there are also fine microscopic spiral striæ; this spiral sculpture, with the qualifications noted, covers the whole shell; transverse sculpture of intervarical nodes obsolete or obscure on the last whorl, growing stronger and sharper toward the apex; apart from the varices the only other sculpture, in a transverse sense, is due to irregularities of growth or faint incremental lines; the varices on the last whorl are slightly elevated, rounded ridges, extending from the suture to the end of the canal; behind the periphery the whorl is flattened; at the periphery or shoulder of the whorl each varix is extended in a strong, stout, single hollow spine, rounded behind, deeply narrowly grooved in front, curving slightly upward and more strongly backward toward its distal end; the aperture is ovate, rounded behind, a little pointed in front, with a thin, raised edge, white or waxen internally and without denticulations; the canal is closed, long, stout, obliquely truncate in front, showing two older termini at the left beside the one in actual use. Maximum longitude of shell, 70; maximum latitude, including spines, 63; latitude of aperture, 13.5; longitude of aperture, 20^{mm}.

HAB.—Station 2838, off Cerros Island, Lower California, in 44 fathoms, mud.

The only species with which this fine *Murex* need be compared is *M. centrifugus* Hinds, a member of the same faunal region, which also was collected near Cape St. Lucas, in 12 to 51 fathoms. The specimens of *M. centrifugus* hitherto collected have not exceeded 35^{mm} in total length. The most obvious difference between the young of *M. Leeanus* and *M. centrifugus* of the same size is seen in the varical processes. In *M. Leeanus* a section of these processes at any age is oval, with a deep groove on the anterior side which is widest internally, since the lips of the groove fold over one another in most cases, so that the processes contain a permanent subtubular gutter. In *M. centrifugus* the varical spines are triangular in section, the anterior margins do not approach one another, and a shallow median sulcus on the front of the spine is the only representative of the groove of *M. Leeanus.* Below the main spine on each varix in *M. centrifugus* are three smaller flat spines; on *M. Leeanus* the varix is rounded and without spines. The intervarical node in *M. Leeanus* is obsolete or obscure and rounded; in *M. centrifugus* it is much more prominent in proportion and forms an oblique rather narrow rib with a kind of elbow at the periphery. The most prominent character of *M. Leeanus* is the rounded, root-like, sleek varical spine.

It is named in honor of Prof. Leslie A. Lee, of Bowdoin College, in charge of the scientific work of the *Albatross* party during the voyage.

The specimen was a female. The foot is auriculate and double edged in front, short, rounded behind, with nearly smooth sides. The eyes are small, the basal two-thirds of the tentacles behind the eyes is stout and thick, the distal part beyond the eyes much more slender.

The dentition is typically muricoid, the radula small and narrow, the central tooth very wide, very short, and with three inconspicuous denticles on its cusp. The soft parts hardly differ externally from those of *Murex brandaris* L.

Subgenus PTERONOTUS Swainson.

Pteronotus phaneus Dall.

Plate XI, Fig. 1.

Pteronotus phaneus Dall, Bull. Mus. Comp Zoöl., XVIII, p. 201, June, 1889.

Shell ashy white, elongated, thin, six-whorled. Nucleus translucent, smooth, polished, of about one and a half whorls; whorls slightly convex, appressed to the suture behind them, connected by three continuous fin-like varices which in descending the spire make about half a revolution around it; these varices on the upper whorls were extended backward into a little wing-like point with dentate edges; on the last whorl the lines of growth indicate that the thin margin was rounded parallel with the whorl. Transverse sculpture of fine growth lines, and on the last two whorls at the periphery three short little narrow pinched-up riblets between the varices; spiral sculpture of fine rather faint striæ and wider undulations, hardly visible except on the varices; of these there are nine or ten on the last varix. Aperture elongate-oval, internally white, thickened, smooth; canal rather long, open, bent back. Maximum longitude of shell, 17; of last whorl, 13.5; of aperture, 5; maximum latitude of aperture, 3; of shell, 8^{mm}.

HAB.—U. S. Fish Commission Station 2662, off St. Augustine, Florida, in 431 fathoms, sand; temperature 43°.7 F.; also at Station 2668, in 294 fathoms.

This species agrees more nearly with the Indo-Pacific species by having three intervarical ribs, while the Atlantic species hitherto known have only one. It is, however, more nearly related to *P. tristichus* Dall than to any hitherto described, as far as I have been able to ascertain. The body of the shell is not unlike that of *P. cordismei* Watson, figured in the *Challenger* report, but the present species has none of the semitubular spines which give the Australian shell the look of a *Typhis.* A variety almost wants the intervarical ribs and has the fin-like point of the varices present on all of them. It is probable that there is a good deal of variation in these small details.

Genus **EUPLEURA** H. & A. Adams.

Eupleura Stimpsoni Dall.

Plate XI, Fig. 3.

Eupleura Stimpsoni Dall, Bull. Mus. Comp. Zoöl., XVIII, p. 204, June, 1889.

Shell small, thin, whitish, not polished, with four varices to the whorl and five whorls; nucleus smooth, white; spiral sculpture of extremely fine faint striæ and of (on the last whorl) five low keels, most prominent on the back of the varices. The posterior keel is produced at the shoulder as a spine, which on the front side of the varix looks as if it were holding up the webbing of the varix as a tent-pole holds a tent; the other keels are represented on the front of the varix only by shallow grooves. The transverse sculpture is composed of well-marked incremental lines; above the spine on the last whorl the web of the varix extends to the fifth preceding varix; below the spine it follows the outline of the aperture nearly, and terminates midway down the canal; the margin is even except at the spine and the ends of the grooves; aperture rounded, continuously marginate except at the open narrow canal; there are four teeth inside the outer lip in front of the spine, and three near the front of the inner lip; the canal is slightly recurved, the end of the antecedent canal projecting from it at the left; suture well marked. Maximum longitude of shell, 12; of last whorl, 9; of aperture, 3; of canal, 4; maximum latitude of aperture, 2.2; of the varix at the spine, 2.8; of the shell, 7^{mm}.

HAB.—Near Barbados, in about 100 fathoms; dredged alive, but the soft parts were lost before the specimens were received.

Subfamily PURPURINÆ.

Genus **PURPURA** Bruguière.

Purpura deltoidea Gmelin.

Purpura hæmastoma L. var. **trinidadensis** Guppy.

The above were collected at the Abrolhos Islands, on the southeast coast of Brazil.

Subfamily CORALLIOPHILINÆ.

Genus CORALLIOPHILA Adams.

Coralliophila abbreviata Lamarck.

Collected at the Abrolhos Islands. It is frequently called *C. galea* Chemnitz, but that author did not use the Linnean nomenclature.

Suborder STREPTODONTA.

Superfamily PTENOGLOSSA.

Family SCALIDÆ.

Genus SCALA (Humphrey) Auct.

Section ACRILLA A. Adams.

Scala pompholyx sp. nov.

Shell thin, conical, inflated, white, with a pale yellow epidermis, smooth, polished, glassy nucleus, and nine or more whorls; spiral sculpture of fine numerous close-set rounded threads, with narrower interspaces, covering the whole surface, and a single stouter thread marginating the base, on which the suture runs; transverse sculpture of rather irregular rounded wrinkles following the incremental lines when present, but often absent, to some extent reticulating the stronger spirals; also of extremely thin, hardly raised, varical lamellæ, about 32 on the last whorl; these are a little more elevated in the vicinity of the suture and a little fainter on the base; suture distinct, not deep; base imperforate; aperture subcircular, a little angulated below. Maximum longitude of shell, 14; of last whorl, 8; maximum diameter, 7.6^{mm}.

HAB.—Station 2807, near Galapagos Islands, in 812 fathoms, ooze; temperature, 38°.4 F.

This species is remarkable for its faint reticulated sculpture, its thin and inflated whorls, and its rapid increase in diameter. I do not find any closely related species to compare it with.

Scala babylonia Dall.

Plate XI, Fig. 8.

Scala babylonia Dall, *op. cit.*, p. 311, June, 1889.

Shell thin, white, elongate, with fifteen rounded whorls (nucleus lost), each ornamented with about twenty-five thin sharp varices, each of which has a small triangular sharp point half-way from the suture to the periphery; behind these the interspaces are smooth to the suture; in front of the varical points the surface is sculptured with raised flat-topped threads with wider intervals between them and numerous still finer spiral striæ; the spiral sculpture does not crenulate the varices; shell imperforate, without basal disk or cordon; aperture small; lip thin, narrow, hardly reflected, tortuous, and a little patulous at the anterior end of the axis; suture very deep. Longitude, 30; maximum latitude, 6.5^{mm}.

HAB.—Station 2678, off Cape Fear, in 731 fathoms, light gray ooze; bottom temperature, 38°.7 F.

The specimen procured was fresh, but without the soft parts. This beautiful species somewhat resembles Verrill's figure of *S. Dalliana*, but is longer, much more cylindrical, and has strong spiral sculpture which is wanting in that species. The upper fourth of *S. babylonia*, which would about correspond in size to *S. Dalliana*, has the costæ more sparse, thin and erect, the whorls much rounder, and the suture much deeper than in that species. None of the other species described from deep water are much like it.

Scala denticulata Sowerby.

Collected at Station 2762, east from Rio Janeiro, in 59 fathoms, mud.

Genus **ACLIS** Lovén.

Aclis nucleata Dall.

Aclis nucleata Dall, Bull. Mus. Comp. Zoöl., XVIII, p. 325, Pl. XVIII, Fig. 7, June, 1889.

First collected by the *Blake* at St. Vincent, West Indies; then by the U. S. Fish Commission, in 294 fathoms, off Fernandina, Florida. The *Albatross* still further extends the list of localities by adding Station 2750, off the island of St. Bartholomew, in 496 fathoms, sand; temperature 44°.4 F.

This last specimen is the finest yet found, and measures 17^{mm} long by 4.8^{mm} in maximum diameter.

Genus **PERISTICHIA** Dall.

Peristichia Dall, Bull. Mus. Comp. Zoöl., XVIII, p. 339, 1889.

Shell elongated, acute, many-whorled, dextral, with a small, sinistral nucleus, spirally or reticulately sculptured; aperture ovate, lips thickened; columella straight, simple, without plaits, a basal cord entering the aperture on the body between the pillar and the outer lip; aperture anteriorly a little effuse, but not channeled in front of the pillar; outer lip varicoid in the adult, internally with a few very strong liræ; soft parts?

Type, *Peristichia toreta* Dall.

This genus has the spire, sculpture, and nucleus of *Mathilda;* the basal cord is like that of *Oscilla nivea;* the outer lip, though less patulous and more varicose, has something about it which recalls *Rissoina*. It is like an *Oscilla* without columellar plaits, or like a *Mathilda* with a thickened and internally lirate peritreme and rounded base. As far as one may judge from the characters of the shell alone, this genus would indicate the passage between *Mathilda* and *Oscilla*.

Peristichia toreta Dall.

Plate XI, Fig. 10.

Peristichia toreta Dall, Bull. Mus. Comp. Zoöl., XVIII, p. 340, June, 1889.

Shell slender, yellowish white, thirteen-whorled; nucleus minute, glassy, set on edge, having about two turbinate whorls; spire with the suture distinct, marked by a plain or slightly undulate thread behind it; behind this is a strong nodulated spiral, with round nodules, then a little interval and two more, slightly smaller, similar nodulous spirals, adjacent to each other and to the suture behind them; the last whorl would show about thirty-four nodules in its circuit; transverse sculpture of elevated ridges, visible in the interspaces following the line of the nodules across the whorl; on the rounded base they appear as strong radii; base with one strong cord, with a deep sulcus outside of it, and the space between it and the pillar somewhat excavated; aperture ovate; pillar straight, forming almost a right-angle with the lip in front of it; outer lip with three strong internal liræ; body with the basal cord projecting, slightly covered with enamel; outer lip swollen, varicose, and whiter than the rest of the shell, its margin undulated by the external sculpture; callus joining the pillar and outer lips distinct and continuous. Maximum longitude of shell, 10.75; of last whorl, 3; maximum latitude of shell, 3^{mm}.

HAB.—Coast of North Carolina, at U. S. Fish Commission Stations 2607, 2608, in 18 to 22 fathoms, sand, 16 miles off Cape Lookout; bottom temperature 73° to 78° F. Charlotte Harbor, West Florida, in 2 fathoms, weedy bottom; Dall. Key West, between tides; H. Hemphill.

This is an extremely elegant shell, in which the relative strength of the transverse and the spiral sculpture varies somewhat in different individuals. The sides of the spire are straight, but the whorls are distinctly marked.

The color in very fresh specimens is a milky white, more or less clouded with pale yellowish brown on the base or sides.

Superfamily TÆNIOGLOSSA.

Family TRITONIIDÆ.

Genus **TRITONIUM** Link.

Subgenus RANULARIA Schumacher.

Ranularia tuberosa Lamarck.

Collected off the Rio de la Plata, in 10½ fathoms, sandy bottom.

Family OÖCORITIDÆ.

Genus **OÖCORYS** Fischer.

Oöcorys sulcata Fischer.

Oöcorys sulcata Dall, Bull. Mus. Comp. Zoöl., XVIII, p. 228, 1889.

Collected at Station 2751, south of St. Kitt's, West Indies, in 687 fathoms, ooze; temperature, 39°.9 F.

Family TRIFORIDÆ.

Genus **TRIFORIS** Deshayes.

Section MASTONIA Hinds.

Triforis pulchella C. B. Adams.

Collected at Station 2758, 90 miles southeast from Cape San Roque, Brazil, in 20 fathoms, shelly bottom.

Family CERITHIIDÆ.

Genus **CERITHIUM** Bruguière.

Cerithium semiferrugineum Lamarck.

This species, which ranges throughout the Antilles and as far north as St. Augustine, Florida, was collected at Port Castries, Santa Lucia, and at Station 2758, off the Brazilian coast, in 20 fathoms.

Family SEGUENZIIDÆ.

Genus **SEGUENZIA** Jeffreys.

Seguenzia monocingulata Seguenza.

Collected at Stations 2751, 2756, and 2760, in 391 to 1,019 fathoms, mud and ooze; temperatures 37°.9 to 40°.4 F. The southernmost station is 90 miles north from Ceara, Brazil, in south latitude 12° 07′ and west longitude 37° 17′.

Seguenzia trispinosa Watson.

Collected at Station 2754, in 880 fathoms, ooze, east from Tobago, and at Stations 2751 and 2760, with the preceding species.

Family VERMETIDÆ.

Genus **VERMETUS** Mörch.

Subgenus PETALOCONCHUS Lea.

Petaloconchus irregularis Orbigny.

Abundant at the Abrolhos Islands, Brazil.

Family LITORINIDÆ.

Genus **LITORINA** Férussac.

Section MELARAPHE Muhlfeldt.

Litorina angulifera Lamarck.

Abundant and large, and rather pale colored, at the Abrolhos Islands. Of the two series of color markings those connected with the spiral striæ were the least conspicuous.

Family LITIOPIDÆ.

Genus **ALABA** A. Adams.

Alaba conoidea Dall.

Alaba conoidea Dall, List of Marine Mollusks, etc., Bull. U. S. Nat. Mus., No. 37, p. 146, 1889.

Shell small, conical, subtranslucent white, with six whorls; apex rather blunt; nucleus not differentiated; whorls polished, sculptured only with obscure incremental lines, suture distinct, a little channeled; sides of the spire flattened, the whorls hardly rounded; the base almost carinate or bluntly rounded; aperture lozenge shaped, angulated at the end of the carina, pointed bluntly in front and behind; body and pillar somewhat callous; operculum normal; the shell has but one or two not very conspicuous varices, all on the last whorl. Maximum longitude 3.3; diameter 1.6^{mm}.

HAB.—Station 2595 and 2596, off Cape Hatteras, North Carolina, in 49 to 63 fathoms, sand; Station 2612, in 52 fathoms, sand, off Cape Lookout, North Carolina; and Station 2668, in 294 fathoms, gravel, off Fernandina, Florida; and by Dr. W. H. Rush, of U. S. S. *Blake*, on the Campeche Bank, in 200 fathoms; temperatures 46° to 75° F.

Family SOLARIIDÆ

Genus **SOLARIUM** Lamarck.

Solarium bisulcatum Orbigny.

Collected at Station 2762, east from Rio Janeiro, in 59 fathoms, mud. It extends northward to the archibenthal area off Martha's Vineyard, where the young was described by Professor Verrill under the name of *S. boreale*.

Family RISSOIDÆ.

Genus **BENTHONELLA** Dall.

Hela Jeffreys, 1870 (*ex parte*) not of Münster, 1830.
Benthonella Dall, Bull. Mus. Comp. Zoöl., XVIII, p. 281, June, 1889.

In the fifth volume of his British Conchology (p. 204, pl. 101, f. 7, 1869), Dr. Jeffreys described a *Lacuna tenella* dredged by Drs. Carpenter and Thomson, in the North Atlantic, at a depth of 180 to 650 fathoms. The types are in the Jeffreys' collection now in the U. S. National Museum. In July, 1870, in the "Annals and Magazine of Natural History," he proposed a genus *Hela* for these shells, which he still retained in the vicinity of *Lacuna*. The name *Hela*, however, had been preoccupied in Crustacea for many years. In the proceedings of the Zoological Society for 1883 (p. 110), he referred his genus to *Cithna*, a subgenus of *Fossarus*, proposed by Arthur Adams (P. Z. S., 1863, p. 110). An examination of three species of *Cithna*, sent by Mr. Adams to Dr. Jeffreys, convinces me that *Cithna* Adams, is not a member of the family *Lacunidæ* nor allied to *Fossarus*, neither is the Japanese genus the same as the *Hela* of Jeffreys. Indeed, *Cithna* Adams, with its small pointed apex and continuous peritreme does not offer any very good characters which might separate it from *Cingula* or *Littorinella*. Owing to the fact that several of Dr. Jeffreys' species of *Hela* or *Cithna* are probably *Vitrinellæ*, I did not at first recognize that the shells which I called *Benthonella* were of the same genus as those first named *Hela*, by Jeffreys. After the Blake Report was in type it suddenly occurred to me that it was remarkable that *Hela* did not appear in the dredgings of the Fish Commission, or the *Blake*. A re-examination of Dr. Jeffreys' material revealed the fact that his original type, and also the *Cithna margaritifera* of Watson should be referred to *Benthonella*. This genus I regard as a thin-shelled deepwater member of the *Rissoidæ*, with a blunt apex, turbinate brownish nuclear shell and a thin paucispiral operculum. The umbilicus is always small, bounded by a more or less evident ridge or angle at the base, the shell is always thin and polished, the aperture simple and sharp-edged, the peritreme interrupted by the body whorl, and the pillar lip arcuated or passing insensibly into the rounded base. The operculum is like that of *Lithoglyphus*, as figured by H. & A. Adams, thin, translucent horn color, without any process internally. The epidermis, if any exists, is so thin and close as to seem absent. The species which may be referred to *Benthonella* are, *B. tenella* (Jeffreys), *B. margaritifera* (Watson), *B. gaza*, *B. Fischeri*, and *B. nisonis* Dall. A shell named *tenella*, by Jeffreys, from the Zanclean formation of Calabria, is not *Hela tenella* Jeffreys, but is possibly a *Benthonella*. The only specimen in the Jeffreys collection is somewhat abnormal. A specimen marked *Hela inflata* Monterosato, seems to be a *Vitrinella;* it was dredged by Nares, in the Mediterranean, in 200 fathoms. *H. fulva* Jeffreys, from Korea (St. John), is not a *Benthonella*. *Cithna Adamsi*, *cincta*, *carinata*, and *naticiformis* of Jeffreys (P. Z. S., 1883, pp. 111–112, pl. xx) do not belong to *Benthonella* nor to the original *Cithna* of Adams. They resemble *Vitrinella* as much as anything else.

A careful scrutiny of the specimens in the Jeffreys collection shows that *B. tenella* was collected by the *Porcupine* in 1869 at stations 4, 23, 23*a*, 36, 39, 40, and 41; in 1870 at stations 16, 17, 51, 54, and 55. It was also dredged in the Mediterranean by Spratt and Nares in 96 to 600 fathoms. *B. margaritifera* (which is very like *B. Fischeri*, but ribbed transversely) was obtained by the *Porcupine* in 1870 at stations 16, 17, 17*a*, and 22; also in Setubal Bay and off Cape Espichel.

The three West Atlantic forms seem uniformly larger than those from the Mediterranean and Eastern Atlantic. All the species are closely related and differ in details of form, size, and proportion rather than by more salient characters. The dried animal remains in one of the specimens of *B. margaritifera* together with the operculum, and I hope later to examine the dentition of it.

Benthonella gaza Dall.

Plate XI, Fig. 5.

Benthonella gaza Dall, Bull. Mus. Comp. Zoöl., XVIII, p. 282, June, 1889.

Shell elongated, glistening opaque white, extremely thin, with two and a half larval and five later whorls. Nucleus trochiform, brown, polished, with a single carina above the periphery; other whorls full, rounded, the earlier ones marked with a few faint flexuous transverse waves, the rest with only lines of growth. The whorls are full and rounded, the suture distinct; base full, rounded, with a small umbilicus, in front of which is reflected the thin inner lip; aperture rounded, lip slightly reflected, not thickened. Longitude of shell, 8; of last whorl, 4; maximum latitude of shell, 4^{mm}.

HAB.—Station 2352, west of Cuba, in 463 fathoms, coral; also at Station 2394, between the delta of the Mississippi and Cedar Keys, Florida, in 420 fathoms, mud; temperature 41°.8; Station 2751, south of St. Kitts, West Indies, in 687 fathoms, ooze; temperature 39°.9 F. Station 2754, in 880 fathoms, ooze, east from Tobago; temperature 37°.9; and Station 2760, 90 miles north from Ceara, Brazil, in 1,019 fathoms, broken coral; temperature 39°.4 F.

This species may be regarded as the type. Its polished white rounded simple whorls and brown tip present an elegant appearance.

Family ADEORBIDÆ?

Genus ADEORBIS Wood.

Adeorbis sincera sp. nov.

Plate XII, Fig. 2.

Shell small, depressed, white, with a deep olive epidermis, four-whorled; nucleus not differentiated, smooth, regular; surface of shell polished, sculptured only by incremental lines; whorls full and regularly descending; after the first whorl nearly all specimens have a flattened area in front of the suture, strongest in the apical whorls, where it is usually bounded in front by a sharp carina or angle on the whorl; this decreases and is nearly obsolete on the last whorl; in the same way the umbilicus is generally bounded by a well-marked angle which is visible even on the margin of the aperture, and is less prominent on the adult than in the young; other specimens have the whorls evenly rounded; umbilicus wide; aperture complete, continuous, nearly circular, except at the upper end of the outer lip where it joins the body, where there is a slight angle; young and strongly carinate specimens show angles in the margin corresponding to the carina. Maximum diameter, 3.25; minimum diameter, 2.5; altitude, 2.6^{mm}.

HAB.—Station 2668, off Fernandina, Florida, in 294 fathoms, shelly bottom; and Station 2756, off the Para River, Brazil, in 391 fathoms, sand; temperature 40°.4 to 46°.3 F.

This shell is very like *Valvata sincera*, though smaller and of an olivaceous brown when perfect. The aperture is sometimes slightly thickened inside, so it may prove to be a *Mölleria*. I have not seen the operculum and the generic reference is merely provisional.

I regard the genus *Adeorbis* as closely related to *Skenea*, with which it may possibly be necessary to unite it. But though the type is Rissoid, doubtless numerous species belonging to the *Cyclostrematidæ* or other Trochoid groups may have been referred to it in the absence of the soft parts.

Family CALYPTRÆIDÆ.

Genus **MITRULARIA** Schumacher.

Mitrularia equestris Linné.

Collected at the Abrolhos Islands, Brazil.

Genus **CREPIDULA** Lamarck.

Crepidula (Sandalium) aculeata Gmelin.

Collected at Station 2762, east of Rio Janeiro, in 59 fathoms; Stations 2764 and 2765, in 10 to 12 fathoms, off the Rio de la Plata.

Family CAPULIDÆ.

Genus **CAPULUS** Montfort.

Capulus incurvatus Gmelin.

Collected at the Abrolhos Islands, Brazil.

Family AMALTHEIDÆ.

Genus **AMALTHEA** Schumacher.

Amalthea effodiens Carpenter.

Collected at Station 2758, 90 miles southeast from Cape San Roque, Brazil, in 20 fathoms, gravel.

Amalthea antiquata Linné.

Amalthea costellata Carpenter.

The preceding two species were found at the Abrolhos Islands, near Porto Allegre, North Brazil.

Family NATICIDÆ.

Genus **NATICA** Lamarck.

Natica canrena Lamarck.

Collected at Station 2762, east from Rio Janeiro, in 59 fathoms, mud, and Station 2765, off the Rio de la Plata, in 10½ fathoms; temperature 57°.1 F.

Natica maroccana Dillwyn.

Obtained at Station 2751, in 687 fathoms, ooze, south of St. Kitts, West Indies. Probably adventitious from shallower water.

Subgenus LUNATIA Gray.

Lunatia fringilla Dall.

Natica fringilla Dall, Bull. Mus. Comp. Zoöl., IX, p. 93, September, 1881.
Lunatia fringilla Dall, *op. cit.*, XVIII, p. 295, Pl. XXI, Fig. 12, 1889.

Collected at Station 2754, east of Tobago, in 880 fathoms, ooze, and Station 2756, off the Para River, Brazil, in 391 fathoms, sand; temperatures 37°.9 and 40°.4 F.

Superfamily DOCOGLOSSA.

Family ACMÆIDÆ.

Genus **ACMÆA** Eschscholtz.

Acmæa melanoleuca Gmelin.

Collected abundantly at the Abrolhos Islands, near Porto Allegre, North Brazil. It extends northward to Florida.

Superfamily RHIPIDOGLOSSA.

Family COCCULINIDÆ.

Genus **COCCULINA** Dall.

Cocculina Beanii Dall.

Collected at Station 2754, east from Tobago, in 880 fathoms, ooze; temperature 37°.9 F. *Tectura adunca* Jeffreys, as far as one can tell from an examination of the shell alone, is a synonym of this species.

Cocculina pocillum sp. nov.

Shell small, stout, short, high, arched in front, bluish white, with a dark-brown epidermis; ends evenly rounded, sides nearly straight on the margin; sculpture of numerous larger obscure radii, each pair with about three finer intercalary ones, slightly scalloped by the very fine slightly raised incremental lines; over all where the surface is perfect is a fine, dust like, microscopic granulation; margin entire; apex projecting backward, decurved in the posterior third of the length; the summit arched slightly above it; interior bluish white, polished; maximum longitude, 5.5; latitude, 3.7; altitude, 3.5; apex in front of hinder margin, 1.5^{mm}.

HAB.—With the preceding species.

This species is not much like any of those previously described. Two male specimens were taken, each with a well marked verge extending from the right tentacle. It has no posterior epipodial filaments, and therefore should be placed in the section or subgenus *Coccopygia*.

Family TURBINIDÆ.

Genus **ASTRALIUM** Link.

Astralium americanum Gmelin.

Collected at the Abrolhos Islands, Brazil, and extending thence northward to Florida.

Family TROCHIDÆ.

Genus **OMPHALIUS** Philippi.

Omphalius fasciatus Born. (var.)

Collected at the Abrolhos Islands.

Genus **CANTHARIDUS** Montfort.

Subgenus HALISTYLUS Dall.

Shell small, cylindrical, holostomate, polychromatic; operculum multispiral, coriaceous; dental formula $\frac{1}{x+4.4+x}$; type, *H. columna* Dall.

This group differs from *Leiopyrga* in its holostomate aperture and absence of spiral sculpture.

Halistylus columna sp. nov.

Plate IX, Fig. 7.

Shell small, subcylindrical, blunt-tipped, polished; yellow, brown, salmon-colored, bluish gray, or streaked or banded with these colors; seven whorled; apex flattish; nucleus not differentiated, small; whorls, after the second, nearly equal in diameter; suture much appressed, the whorl somewhat constricted in front of it; sculpture only of faint incremental lines; base rounded; aperture rounded ovate, slightly oblique; outer lip continuous with the pillar, which is raised, arched in harmony with the lip, but not reflected; no umbilicus; lip simple, hardly thickened; a little callus on the body and in the posterior angle between the lip and body; throat simple, very slightly pearly; operculum circular, externally shaggy, with many whorls; animal with long slender tentacles; the eyes black, on separate rather long peduncles; epipodial line indicated by four or six short stout papillæ; foot short and broad; muzzle rather large and long, a little indented in the middle line; median and admedian teeth simple, with narrow straight stems, and simple, wide, mushroom-like cusps; uncini numerous, filiform; admedian teeth four, the outer ones the larger; stems and bases of the middle part of the radula so small and thin as to be difficult to distinguish; maximum longitude of shell, 5.8; maximum latitude, 1.9; longitude of aperture, 1.2^{mm}.

HAB.—Station 2762, off Rio Janeiro, in 59 fathoms, mud; temperature 57° F.; Stations 2764 and 2765, off the Rio de la Plata, in 10 to 12 fathoms, sand.

This singular little shell appears to be the only representative on the shores of America of the Australasian *Bankivia.* The tentacles did not appear ciliated, nor could I observe any cephalic lappets between them. The difficulties of observation, however, are so great with so minute an object that their absence can not be dogmatically affirmed merely from an examination of alcoholic specimens.

Genus **GAZA** Watson.

Gaza Watson, Jour. Linn. Soc., XIV, p. 601, 1879; *Challenger* Gastr., p. 93, 1885. Type *G. dædala* Watson.

Gaza Rathbuni Dall.

Plate VII, Fig. 4.

Gaza Rathbuni Dall, Bull. Mus. Comp. Zoöl., XVIII, p. 354, June, 1889.

This species differs from its nearest ally among those already known (*G. superba* Dall) by being more depressed, with stronger spiral grooving, a slightly smaller umbilicus, and more flattened over the sutures. The single specimen obtained has not yet formed the reflected lip and callus over the umbilicus. Maximum altitude of shell, 24; maximum latitude, 38^{mm}.

Operculum of about seven whorls, thin and polished, slightly centrally concave, with a narrow thinner band marginating the coil. It has a maximum diameter of 16^{mm}.

HAB.—Station 2818, near the Galapagos Islands, in 392 fathoms, sand; bottom temperature 44° F.

As the specimen of this fine species is not quite mature it has been figured in a position which will enable it to be compared with *G. superba* and other species of the genus. The soft parts recall those of *G. superba* Dall, but the muzzle seems shorter and there are seven slender, rather long epipodial filaments on the right side, instead of five as in *G. superba.* The intestine is crammed with foraminifera. The pointed tail-end of the foot, in the contracted animal, is turned directly down and in, so that the angles of the fold stand out and at first give the impression that the foot is bifid, behind.

Subgenus CALLOGAZA Dall.

Callogaza Watsoni Dall.

C. Watsoni Dall, Bull. Mus. Comp. Zoöl., IX, p. 50, 1881; XVIII, p. 356; Pl. XXII, Figs. 7, 7*a*, 1889.

HAB.—Antilles, between Florida Strait and Barbados, in 84 to 640 fathoms, *Blake* expedition. Station 2756, in 391 fathoms, sand, off the Para River, Brazil; temperature 40°.4 F.

This extends the known range southward about 1,000 miles.

Genus **CALLIOSTOMA** Swainson.

Calliostoma platinum sp. nov.

Plate VII, Fig. 2.

Shell large, thin, polished, iridescent white, with seven whorls beside the nucleus; nucleus minute, lost; subsequent whorls slightly flattened behind the periphery, full and rounded on the base; longitudinal sculpture of obscure spiral lines behind the periphery and somewhat stronger flattish threads, separated by shallow grooves, on the base; at the periphery is a single prominent thread, immediately in front of which is the suture, the succeeding whorl being appressed against the thread; the single specimen obtained has a second prominent thread about two millimeters behind the peripheral one on the last whorl, but it is probable that the development of this thread was stimulated by an injury of which traces are plainly visible just before the second thread begins; base full and rounded; aperture rounded quadrate; the outer lip thin and sharp, its plane oblique and slightly flexuous; body with a very faint wash of callus; pillar slender, pearly, slightly arched, very little reflected, simple; interior polished, iridescent, without liræ; the external sculpture faintly perceptible owing to the tenuity of the shell. Maximum longitude of shell, 32; maximum latitude, 29^{mm}.

HAB.—Station 2839, near the Santa Barbara Islands, California, in 414 fathoms, sand; with *Turcicula Bairdii.*

The operculum of this species has about fourteen very narrow whorls, is polished internally and somewhat rough externally from the projecting margin of the coils. It bears about the same proportion to the aperture as in the shallow water species. The shell itself is less attractive than most of the group, but indicates that some individuals of the species may have a delicate pale iridescence. The exterior of this specimen shows little pearliness and is chiefly of a somewhat livid white, like the eye of a boiled fish.

The soft parts are whitish; the head and the sides of the foot below the epipodial line are profusely granulose; among the granules rise pointed larger papillæ, also very granulose, so as to appear almost arborescent. The epipodial line projects moderately, with a finely fringed edge. There are two moderate-sized filaments in front of the operculum and two smaller ones beneath it. The foot is long, rather narrow, double-edged, and somewhat auriculate in front, with a wide transversely rugose median channel behind the operculum about the tail. The oral surface is granulous, the corners are a little produced. The tentacles are long and slender, the eyes very large and black. There are no palmettes. The gill resembles that of *Turcicula*, but is less triangular as a whole. The mantle margin is finely papillose. The jaws are small and not remarkable. The dentition was not examined.

Calliostoma tæniatum Wood.

Trochus tæniatus Wood, Ind. Test. Suppl., Pl. v, Fig. 12, 1828; Phil. Mon., Trochidæ, p. 251, t. 37, Fig. 12.
Trochus bicolor Lesson; Voy. Coq., p. 345, t. 16, f. 3.

HAB.—Falkland Islands (Philippi). Station 2770, in 58 fathoms, sand, off Spring Bay, east coast of Patagonia, and also at Station 2771, off Point Gallegos, in 50 fathoms, sand; temperature 49°.4 F.

This species is referred to *Photinula* by H. & A. Adams, but appears to be simply a smooth *Calliostoma.* There is no umbilical callus as in *Photinula cærulescens*, which was also obtained by the *Albatross* at Stations 2770 and 2771.

Calliostoma Coppingeri Smith.

Plate XII, Fig. 4.

Trochus (*Ziziphinus*) *Coppingeri* E. A. Smith, Ann. Mag. Nat. Hist., Ser. 5, Vol. VI, No. 34, p. 320, Oct., 1880.

Shell glistening, small, flattened at the periphery, seven-whorled; color pale waxen white, with pinkish nacre; the exterior on the spiral sculpture more or less articulated, with elongated brown spots; these are sometimes wholly absent, but disappear last on the carinal threads; nucleus white, small, subglobular, polished, not sculptured; early whorls spirally threaded, the two threads next in front of the suture granulous; these and all the others become flattened out and obsolete on the last whorl or two of the adult in most cases, but are exceptionally retained; the periphery of the whorls is angulated but not keeled; in front of it is another angle on which the suture is laid; the space between is flattened and nearly vertical, becoming more inclined on the last whorl; transverse sculpture of inconspicuous incremental lines, rarely emphasized; base moderately convex; the umbilical region impressed and surrounded by three or four coarse, often articulated spiral threads; outer lips thin, sharp, rounding to the columella without noticeable interruption; pillar somewhat arched, pearly, rather strong; body with a faint wash of callus; operculum amber-colored, thin, multispiral. Maximum altitude of shell, 10; diameter, 11^{mm}.

HAB.—Stations 2765, 2766, in 10 fathoms, sand, off the Rio de la Plata, and 2768, off Cape Delgado, in 43 fathoms, sand.

This shell was at first supposed to be new, but it is probably the unfigured species described by Mr. Smith from 28 fathoms off the mouth of the Rio de la Plata in latitude 36° 47′ S.

This species has much such a surface as *C. yucatecanum* Dall, which, however, is umbilicated. There is a small swelling, hardly a tooth, at the end of the pillar. Its colors look washed out; otherwise they also recall those of *C. yucatecanum.* There are no liræ in the throat. Occasional specimens have the spiral sculpture emphasized; in such cases the flattening of the periphery becomes less prominent. Now and then one of these strongly sculptured forms has all the threads behind the periphery undulated or granulous, forming a variety which may be called *C. Coppingeri* var. *cymatum*.

Calliostoma riöensis sp. nov.

Plate XII, Fig. 5.

Shell of a waxen color, nearly obscured by clouds, flammules, and articulations of lighter or deeper flesh color; whorls eight, somewhat flattened above, angulated around the base, spirally granulosely threaded; apex pointed; nucleus small, white, dextral; spiral sculpture of alternately larger and smaller threads, of which at the beginning of the last whorl there are six each between the sutures; the paired thread on which the suture runs and the next primary behind it are distinctly wider than the other primaries; all are set with close rounded granules, which are only moderately prominent; the interspaces are about as wide as the secondary threads; the base has about a dozen rather strong spirals, with subequal interspaces, but no secondary finer threads; transverse sculpture only of lines of growth; the whorls and base are only slightly convex; aperture subquadrate, the outer lip sharp; pillar stout, short, a little angulated at its anterior point, pearly, and hardly reflected over the imperforate umbilical region. Maximum altitude of shell, 15; maximum diameter of base, 14^{mm}.

HAB.—Rio Janeiro, on the Encuados Islets, U. S. Exploring Expedition. *Albatross* Expedition at Station 2762, off Rio, in 59 fathoms, mud; temperature 57°; Stations 2764 and 2765, off Rio la Plata, in 10 to 12 fathoms, sand.

This species recalls *C. jucundum* Gould, from New Zealand, and *C. euglyptum* Adams, from Florida, but is sufficiently distinct from either. It is less elegantly painted than *C. jucundum*, and the same may be said of its relation to the finer specimens of *C. euglyptum*, which also has its whorls more rounded and its flammules more regular.

C. riöensis is very apt to be overgrown with Polyzoa; few of the specimens are free from them. The operculum and soft parts are as usual in the group.

Genus MARGARITA Leach.

Subgenus TURCICULA Dall.

Turcicula Dall, Bull. Mus. Comp. Zoöl., IX, p. 42, 1881.

This group is remarkable among Trochidæ for its large size and thin shell with delicate green epidermis and reflected peristome like a land shell. The type of the group is small compared with the others now known, but has the characteristic surface sculpture and form, though no perfectly adult and complete specimen has yet come to hand. The voyage of the *Albatross* has given us two fine species from the Pacific belonging to this group, which are perhaps the finest mollusks collected during the voyage.

Turcicula Bairdii Dall.

Plate VII, Fig. 3.

Turcicula Bairdii Dall, Bull. Mus. Comp. Zoöl., XVIII, pp. 376–378, June, 1889.

Shell large, turbinate, elevated, thin, inflated, with four and a half or five whorls, of which the last is much the largest; surface apt to be eroded, but where perfect covered with an extremely thin dense vernicose pale apple-green epidermis; whorls inflated; suture deep, not channeled; apex moderately pointed; spiral sculpture of (1) numerous fine faint rather irregular scratches or impressed lines; (2) sparse slightly elevated revolving bands which are usually more or less nodulous, the nodules when prominent being sharp and laterally flattened as if pinched up; of these there are on the upper whorls usually three series between the sutures, of which one at the periphery is the most prominent and persistent, the next one behind it, half way between the periphery and the suture, being the least marked; on the base the cinguli are six or seven in number, becoming narrower toward the axis, smaller than those behind the suture, with smaller, less prominent, rounder and more numerous nodules; there is some variation in number and strength of all the cinguli, but that on the periphery is the most prominent and constant; the whorls are particularly round and inflated above and below, so that the outline of the aperture is often nearly circular; interior of the aperture brilliantly pearly, a thin wash of callus on the body; the outer lip very slightly thickened and distinctly reflected in the adult; pillar thin, simple, arching roundly into the curve of the base without any interruption, angle, or tooth; axis imperforate; the external sculpture showing through the thin shell. Altitude 50; maximum diameter 42^{mm}. Maximum diameter of operculum 18^{mm}, with about twelve whorls. The operculum is externally polished, smooth and deeply concave; the inner side presents a minute central rounded elevated point; the margin is very thin but entire.

HAB.—Station 2839, off San Clemente Island, California, in 414 fathoms, sand; bottom temperature not registered.

Soft parts.—The sides of the foot below the epipodial line are granulous; above the line the surface is rather smooth. Much of the surface is apt to be covered with a layer of blackish or olivaceous substance, like solidified mucus or paint, which seems to belong to the animal, yet is wholly external to the cuticle. The foot is broad, not very long, bluntly pointed behind, the front edge straight, double, the lateral angles pointed; the upper layer of the edge is smooth and turgid in most of the specimens; it is not indented in the median line.

The muzzle is stout, circularly wrinkled, a little expanded at the disk; the oral disk is not marginated; its surface is finely granulose; it is angulated at its lower outer corners and medially indented below. There are no oral palps or tactile appendages.

The cephalic tentacles, for the size of the animal, are small and short. At their inner bases are small "palmettes," or cephalic epipodial fringes, not quite meeting in the middle line. They are rounded, with papillose edges. At the outer bases of the tentacles are the eyes, large, oliviform, mounted on short pedicels. The pigmented portion itself is ovoid and not hemispherical. In some specimens the pigment seems to be more extensive on the under side, in others the reverse, and still others have it equally distributed. A lens and aqueous humor are distinctly observable. At the right side, behind and on a level with the eye, is a short tubular verge. The anterior epipodial side lappet does not appear to be modified into a seminal conduit, as in *Margarita infundibulum* Watson. These lappets are nearly symmetrical. Their bases are turned up a little on each side behind the eyes and the lappets are rather wide. They extend backward about two-thirds of the way to the operculum, with a finely papillose edge. Then comes a single tentacular filament, less than half as long as a cephalic tentacle. There is another stretch of edge fringed with only small papillæ; under the operculum there are three long filaments, of which the posterior is longest. Behind the operculum the epipodial lines of the two sides approach each other and bound a median furrow, coarsely transversely ridged (as in *Pleurotomaria*), which extends to the end of the foot.

The mantle edge is smooth or very sparsely papillate, slightly thickened. The free end of the intestine projects on the right side over the neck, with its termination constricted by a sphincter, and then expanded into a cup-shaped circular foramen. On the left side is the gill, consisting of a central, somewhat muscular, ensiform basement, from which depend two sets of elongate triangular lamellæ, separated by a narrow ridge. The left-hand set are slightly the longer. Most of the gill is free. Its distal end is pointed and the lamellæ hang side by side, with the ridge between the two series, as in *Nucula*. The intestine takes a curve to the left side, where the renal gland is visible between it and the gill. I observed no osphradium.

The mouth is small. A short distance behind it is a deep radular diverticulum. The jaws are small, triangular, and dark brown. The gullet opens almost directly into an elongate, large, longitudinally wrinkled stomach. Behind it the very large intestine, with longitudinally striated walls, extends backward about half a whorl, then turns upward and forward for a third of a whorl; then back again upon itself about the same distance; then forward to its anal termination, above described.

The liver and seminal gland appear to resemble those of ordinary Trochids.

The operculum is amber-colored, polished, thin, and centrally depressed. It has about a dozen whorls. The opercular pad is ovoid and rather small.

The radula is quite small and the anterior part dark brown. The intestine, in all the specimens, is crammed with a greenish mud, consisting of disintegrated foraminifera.

The dentition recalls that of *Calliostoma*, *Solariella*, *Margarita*, etc., and presents nothing very characteristic.

The central tooth has a broad thin base, subrectangular, and a little wider at the anterior corners. The stem of the cusp and the cusp are narrow. The latter is simple, rather small, short, and recurved. It is not denticulate. There are three or four admedian or lateral teeth, rather long, with small bases, rather broad, simple, moderately curved brownish cusps. There are about twenty-five uncini, half of which spring from lozenge-shaped bases, looking like a pavement; are long, narrow, slender, moderately curved, with spatuliform tips. One edge of these tips is microscopically serrate, and below the serrate part, on the same side, is a single larger denticle, standing out like a short thumb.

The external uncini are thin, flat, wide, and hardly curved. Their distal ends are flat and broad, with the edge simple and entire. These teeth gradually diminish in size and width, as usual in *Trochidæ*. The formula would be $25+3+\frac{1}{1}+3+25$, or very nearly that; but time has been wanting in which to undertake the laborious task of an exact enumeration of these minute and tangled objects, of which the general features have just been recorded.

All the specimens of *Turcicula* previously obtained were incomplete and deprived of epidermis.

The capture of this and the following species, besides adding to our catalogues two of the finest deep sea mollusks known, has enabled me to fully describe the characters of the group and determine its place in the system of classification.

Turcicula Macdonaldi sp. nov.

Plate VII, Fig. 7.

Shell very large, thin, elevated, with about six whorls, flattened, and appressed above and rounded below. It differs from *T. Bairdii* in the proportionally narrower cinguli of which only that at the periphery is nodulous, in the more numerous (nine to ten) sharper and more elevated basal cinguli, in the flatter posterior surface of the whorl and its being appressed at the suture, in its duller more olivaceous epidermis, more angulated and less reflected outer lip. Although living it was a good deal eroded, especially at the tip. Altitude of decollate shell, 75; maximum diameter, 60^{mm}. The operculum has nine whorls, is of the same shape as in the preceding species, but of a darker brown, with a maximum diameter of 29^{mm}.

HAB.—Station 2792, off Manta, Ecuador, in 401 fathoms, mud; bottom temperature, 43° F.

The single specimen of this magnificent shell contained the animal, which does not appear to differ materially from the *T. Bairdii*. It is named in honor of Col. Marshall McDonald, the present U. S. Fish Commissioner, under whose direction the voyage was carried out.

In this species the "palmettes" or epipodial lobes between the tentacles are proportionally larger than in *T. Bairdii* and have smooth and not fringed edges. The verge is similar but mounted on an onion-shaped expanded base. There is one very short, small, epipodial filament in front of the operculum on each side; under the operculum are two very small, instead of three long filaments as in *T. Bairdii*, on each side. The other features are essentially as in *T. Bairdii.* The renal organ is very extensive, with a corrugated surface, and seems to empty into the rectum shortly before the latter becomes attached to the surface of the mantle.

Subgenus SOLARIELLA A. Adams.

Solariella infundibulum Watson.

Plate IX, Fig. 3.

Trochus (*Margarita*) *infundibulum* Watson, *Challenger* Gastr., p. 84, Pl. v, Fig. 5; Dall, Nautilus, p. 2, May, 1889; *Blake* Gastr., p. 380, June, 1889.

The presence of a verge, or intromittent male organ, has hitherto, among the Rhipidoglossate Mollusks, been recorded only in *Neritina* (Claparède) and certain Limpets. The organ as it exists in *Neritina* and *Nerita* is so short and obscure that its function and even its existence has been called in question. When I showed its existence in the rather anomalous *Addisonia paradoxa* and *Cocculina spinigera*, curious deep sea limpets, it was questioned whether they were not peculiarly modified Tænioglossa.

Since then, in several deep-sea mollusks, such as *Rimula*, *Margarita*, and others indisputably belonging to the *Rhipidoglossa*, I have found a well-developed verge; and there is little doubt that the ancestors of this group, as well as of the *Tænioglossa*, were so provided, and that some of these deep-sea forms have retained the organ now generally obsolete in their shallow-water congeners. In combination with this survival, one of the species, *Trochus infundibulum* Watson, offers a singular and very interesting special modification of the anterior portion of the epipodium on the right side, which appears worthy of particular attention.

The soft parts of this species afford several notes of interest. The external parts, except the eyes, are white. The foot is wide, straight, and double-edged in front, and, as far as one can judge from specimens contracted in alcohol, must have been somewhat pointed or produced at its anterior corners in life. The sides of the foot are nearly smooth below the epipodial line.

The muzzle is small and slender at its proximal end, enlarged and transversely semi-lunar at its distal extremity. The oral surface of the muzzle is smooth, the mouth very small; the oral disk is flat and produced on either side into a thin linguiform lappet, with simple and entire edge. These lappets are remarkably long, their ends reaching as far as the ends of the true tentacles, and serve as tactile organs, like the oral tentacles of the *Lepetidæ*, or the much smaller lappet of *Acmæa*. When not feeding or seeking food, these lappets would seem to be applied to the sides of the foot below the epipodium. The oral disk is entire, but is slightly indented in the median line below a furrow running up toward the mouth.

The cephalic tentacles are very stout and large, very elongate, conical, with moderately pointed tips. They are situated above, and not, as in most *Trochidæ*, on either side of the muzzle. Their inner bases are connate; and there is no inter-tentacular "veil," or any tubercular traces thereof.

The eyes are large, strongly pigmented, ovoid, and sessile on the outer bases of the tentacles, or perhaps I should say, just by the outer bases. They are not pedunculated or elevated on pedicels in any of the specimens examined, and I am quite confident that this is not caused by contraction due to alcohol, but is normal to the species.

The epipodial apparatus is complicated, and exhibits a certain amount of variation between different individuals in the situation and number of its processes. In the males, it is subjected to a remarkable modification for sexual purposes. The epipodium begins immediately behind the eye and a trifle below it. In the females it is produced into a large broadly linguiform process, half as long as the cephalic tentacles and fringed with close-set, uniform, small, pointed papillæ or filaments. This process exists in the males on the left side. The posterior margin then curves in toward the side of the foot; it becomes quite narrow and shows two lateral tentacles of moderate size; then a vacant space; then at the front end of the operculum two or three filaments, small, but larger than any in the vacant space; then another but larger one; and finally another, which is behind the middle of the operculum, and is the last on that side. The epipodial line is continued to the end of the foot, the dorsal surface above it being transversely rugose and with a linear median furrow. On the other (right) side we find a small, a large, two subequal small, and another large filament, followed by a slight gap, and then a still larger tentacular process. The flap, which corresponds to the fringed process on the left side, is remarkably modified in the male.

Behind and close to the right eye is a small tubular, longitudinally striate, cylindrical verge, not exceeding (in alcohol) two millimeters in length. Below it the epipodial flap is enormously produced, and its front edge is rolled upward and backward upon itself, forming a tube into the proximal opening of which the end of the verge may project.

The flap is rolled so that it makes nearly two layers, and thus a very capable cylinder, which, when unrolled and released, will immediately coil itself up again. This cylinder is of subequal diameter throughout, and is as long as, and somewhat stouter than, the cephalic tentacles. Externally, near its base, it is nearly smooth; further out, it is spirally striate; near its extremity, it becomes thicker and rather deeply externally grooved longitudinally, with short, even, close-set, slightly spiral grooves. The opening at the distal end is fringed with short, equal papillæ, each one corresponding to the thickened interspace between two of the grooves. These raised folds or interspaces are also finely transversely striate. At the base of the cylinder the epipodium extends backward to the first lateral filament, and the margin of this part is perfectly entire and simple, showing neither fringe nor granulation. The object of this apparatus is self-evident. The cylinder serves as *a conduit for the seminal fluid ejected from the verge.* Whether it may be employed in an actual copulation is doubtful; it may merely serve to spread the seminal matter over the eggs as they are deposited by the female. I am not aware that anything of this sort has been observed in any other gastropod up to the present time.

The edge of the mantle is smooth, entire, and slightly thickened. Within the nuchal chamber the anus is visible on the right side. The end of the intestine for a considerable distance is free from the mantle and projects like a tentacle. The termination is slightly constricted, then enlarged into a cup or trumpet-shaped ending, which nearly reaches the mantle-edge.

The intestine itself, after leaving the stomach, is much convoluted, but in the main rises and is brought forward nearly to the mantle-edge above the stomach; then turns back and is carried far into the visceral coil before it is again brought forward and terminated as above described. The food consists of Foraminifera.

The gill is free, except at its base, and consists of a very elongate-triangular foundation, from which depend triangular lamellæ without a raphe and widest at their bases. These grow larger proximally.

The operculum is thin, polished, amber-colored, centrally depressed, having a central projection or nipple on its under side, and consists of about four whorls.

The specimen affording the above notes has been identified with Mr. Watson's type specimen, and is now deposited with it in the British Museum.

The diagram upon Plate IX (Fig. 3) illustrates the features described, though crudely drawn. The fringe on the left anterior epipodial lappet is too coarse and irregular. The animal is represented as if crawling. The central obliquely lined area represents in section the portion which would extend into the shell, which latter has been omitted to show the parts more clearly. In front on the right, behind the eye, is seen the verge, behind that the distal free end of the intestine. The posterior epipodial filaments may be traced through the operculum.

This species was obtained by the *Challenger* off Pernambuco and also in the North Atlantic. It was dredged in some numbers by the *Albatross* at Station 2723, 125 miles off the coast of the United States, in north latitude 36° 47′, in 1685 fathoms. An allied species, *S. Ottoi* Philippi, seems to be without this curious sexual modification.

I am aware that this examination does not agree in all respects with the account of Dr. Pelseneer in the *Challenger* Report on the Anatomy of Mollusks, but that account appears to have been somewhat hastily prepared, while the figure of the animal is evidently a diagram and not a portrait. There is, of course, a possibility that some error of identification may have occurred, and that the animal sent to Dr. Pelseneer was not that of the *S. infundibulum.* The specimen here described has been compared with the original type of *infundibulum*, and I suppose there can be no question as to its absolute identity specifically.

Solariella amabilis Jeffreys.

Collected at Station 2754, east from Tobago, in 880 fathoms, ooze.

Solariella clavata Watson.

With the preceding species, and also at Station 2751, in 687 fathoms, ooze, south of St. Kitts.

Solariella oxybasis sp. nov.

Plate XII, Fig. 6.

Shell closely related to *S. Ottoi*, var. *regalis* V. & S., from which it differs most obviously by its more acute and elevated spire, smaller umbilicus, angular periphery, and aperture angulated in front by the juncture of the pillar with the end of the umbilical carina; shell thin, pearly, with a pale, thin epidermis and six (or more) whorls without the nucleus; nucleus lost; spire acute, the last whorl enlarging disproportionately; spiral sculpture of, on the spire, three revolving threads, the most anterior strongest and peripheral, the middle one least evident; the base has six subequal, strong, granular threads and two smaller ones, the latter just within the umbilicus; transverse sculpture of, on the last whorl, about eighteen sharp radii, extending to the periphery and forming sharp nodules at the intersections of the spirals; the nodules on the peripheral spiral are the most prominent and are almost spinose on the last whorl; beside this the whole shell is covered with a fine, silky, transverse, slightly irregular striation; suture distinct, running on the first basal spiral, not channeled; umbilicus very narrow, its margin subangulose; aperture quadrate, subangulate at the periphery, in front, behind, and at the junction of the pillar with the body; body with a wash of pearl; margin continuous with the pillar; sharp, thin, reflecting the sculpture; pillar slightly arched, thin, reflected a little behind; base full and rounded, produced in the middle near the umbilicus; altitude 13.5; maximum diameter 12.5; minimum diameter 10^{mm}.

HAB.—Station 2839, in 414 fathoms, sand, off the Santa Barbara Islands, California.

The soft parts recall those of *S. Ottoi* Phil. This species belongs to the group represented by *S. Ottoi*, *S. infundibulum*, etc., but seems different from either of them. The sculpture, though more spinose, and the form of the aperture recall Watson's figure of his *Bembix æola* in the *Challenger* report (Gastr., Pl. VII, Fig. 13), which, however, has the details of sculpture differently arranged. I should suspect from this that *Bembix* would include this particular group of *Solariella*, all of which have the peculiar silky surface and the same general type of sculpture. The size and carination of the umbilicus, and consequently the form of the aperture, are variable factors in this group of shells.

Trochus alwinæ Lischke has been referred to *Bembix*, but I can see no reason, from the description and excellent figures, why it should be separated from *Calliostoma*. *T. argenteo-nitens* of the same author is much like Watson's *Bembix* as was pointed out by him, though doubtless specifically distinct.

Apropos of *Bembix*, the name was given long since by De Koninck to a remarkable cretaceous land shell like a subspherical decollate *Cylindrella*; the type was examined by me very lately in the Museum of Comparative Zoology at Cambridge, Massachusetts. I have not, so far, had an opportunity of looking up the reference to the description, but according to Fischer (Man. conchyl. p. 827) the name was used and the shell figured in 1861 by Ryckholt. In the form *Bembyx* the name was used by Fabricius for Hymenoptera in 1775, who also printed or misprinted it *Bembex*. It would seem as if the name *Bembix*, as applied by my friend Watson, must be given up. This, however, is of less importance, as the characters given for the group are not sufficient to distinguish it from *Solariella*, or even possibly *Turcicula*. That it may prove, when we know the soft parts, to be distinct, is quite possible, but as yet the characters given for separating it from such species as *Solariella infundibulum* and its allies do not seem very weighty.

Solariella actinophora sp. nov.

Plate XII, Figs. 8, 11.

Shell with a prominent pointed apex, but generally depressed, pearly, with a pale greenish epidermis and six whorls; nucleus glassy, polished, swollen, and slightly tilted; spiral sculpture on the spire of three sharp narrow elevated threads, a finely granular or almost smooth peripheral keel or thread on which the suture runs: on the base three similar less prominent threads, on the anterior of which the pillar lip revolves around the umbilicus, and lastly a very sharp keel, with many strong, sharp nodules, carinating the umbilicus; transverse sculpture on the spire of numerous sharp, elevated, narrow radii, which reach the second spiral counting forward from the suture nodulating both; some of the radii appear to reach the third spiral, but most of them do not, and the nodulations on the third usually alternate with those on the second thread; the nodules are small and pyramidal, the rectangles formed by the reticulations are flattened; beside the primary radii numerous smaller ones start from the suture between the primaries, but rarely extend beyond the first spiral, except on the last whorl, where they disappear toward the periphery; these secondaries are elevated and sublamellose, very regularly spaced, and re-appear on the base within the two anterior spirals, then overrun the carina and ascend the umbilicus in a vertical direction; whorls full and rounded, except as modified by the sculpture; surface polished; suture deep but not channeled; apical part of the spire rather pointed; base full, angulated at the umbilicus, which is large and deep, with nearly vertical, scalar sides; aperture wide, outer lip rounded, thin, sharp; base angulated by the umbilical carina, strictly continuous with the pillar and outer lip; pillar thin, sharp, not reflected, a little concave above the middle, not anywhere thickened; body without callus; maximum diameter of shell, 9; minimum diameter, 7.25; altitude, 7.25$^{\mathrm{mm}}$.

HAB.—Station 2751, south of St. Kitts, in 687 fathoms, ooze; Station 2754, east from Tobago, in 880 fathoms; and Station 2760, 90 miles north of Ceara, in 1,019 fathoms, broken coral; temperatures 37°.9 to 39°.9 F. It has also been found at Guadalupe in 769 fathoms, sand.

This is nearest *S. œgleis* Watson, which is more conical and has a different sculpture, and especially a much more funicular umbilicus. *S. actinophora* is a larger shell than *S. œgleis*, and attains larger dimensions than are here given, judging from fragments among the dredgings.

Genus **BASILISSA** Watson.

Basilissa alta Watson.

Collected with the last species at Stations 2751, 2754, and 2760.

Family DELPHINULIDÆ.

Genus **LIOTIA** Gray.

Liotia Riisii Dunker.

Collected at Station 2758, 90 miles southeast from Cape San Roque, in 20 fathoms, shelly bottom.

Family CYCLOSTREMATIDÆ.

Genus **CYCLOSTREMA** Marryat.

Cyclostrema cistronium Dall.

Plate XI, Fig. 11.

Cyclostrema cistronium Dall, Bull. Mus. Comp. Zoöl, XVIII, p. 394, June, 1889.

Shell small, white, with a polished nucleus, one and a half rounded and as many more carinated whorls; spire depressed; radiating sculpture of fine, close, flexuous threads, which appear chiefly in the interspaces of the spirals, giving the surface a minutely punctate appearance; these extend over the whole surface except of the nuclear whorls; spiral sculpture of, on the summit, seven or eight, between the carinæ six or eight, and on the base ten or fifteen extremely fine threads, even and uniform, with about equal interspaces, some a little granular from the radiating sculpture; beside these there are three very strong carinæ; one forms the margin of the nearly flat spire, the second extends horizontally just below the periphery, the space between them deeply excavated; the third forms the edge of the funicular narrow deep umbilicus. The base is conical, excavated just within the peripheral carina; it rises to the edge of the umbilicus, which is marked by a strong thread, and within is vertically striated. The last whorl descends from the plane, and finally becomes separated from the body whorl; the margin is simple, sharply angulated by the carinations, otherwise the aperture would be ovate, with the columellar side somewhat excavated. Altitude, 1.6; maximum diameter, 2^{mm}.

HAB.—Off the coast of North Carolina, in 22 to 63 fathoms, sand and gravel, at U. S. Fish Commission Stations 2595, 2598, 2608, 2610, and 2612, the temperature varying from 67° to 78° F.

This is a very strongly marked species, in its sculpture recalling *C. Verreauxi* Fischer, which is larger, less elevated, with a proportionally larger umbilicus, and has not the deflected aperture. The latter recalls the characters of *Tubiola divisa* J. Adams, which is otherwise very different.

Cyclostrema pompholyx Dall.

C. pompholyx Dall, Bull. Mus. Comp. Zoöl., XVIII, p. 394, Pl. XVIII, Fig. 9, June, 1889.

This species was originally obtained in the Gulf of Mexico, in 805 fathoms, by the *Blake* expedition, and Dr. Rush obtained a young specimen in 780 fathoms, mud, off Cuba. A specimen with a maximum diameter of 6 and a height of 4.5^{mm} was dredged by the *Albatross* at Station 2754, in 880 fathoms, ooze, off Tobago; bottom temperature, 37°.9 F. This considerably extends the known range southward.

Cyclostrema valvatoides Jeffreys.

Collected at Station 2760, 90 miles north from Ceara, Brazil, in 1,019 fathoms, broken coral; temperature 39°.4 F.

Cyclostrema diaphanum Verrill.

Obtained at Station 2752, off Santa Lucia, in 281 fathoms, sand; temperature 48° F.; and also at Station 2760, with the preceding.

Superfamily ZYGOBRANCHIA.

Family HALIOTIDÆ.

Genus **HALIOTIS** Linné.

Haliotis Pourtalesii ? Dall.

Plate XII, Figs. 1, 3.

H. Pourtalesii Dall, Bull. Mus. Comp. Zoöl., IX, p. 79, 1881; XVIII, p. 395, 1889.

Shell small, of a pale brick-red color, with white dots on some of the spirals, rather elevated, with about two and a half whorls; apex small, prominent; holes about twenty-five, of which five remain open, the margins of these rather prominent; outside the row of holes the usual sulcus is strongly marked; about midway from the suture to the line of holes is a raised rib, rather obscure, but differing in different individuals and corresponding to an internal sulcus; between the central ridge and the suture there are no undulations or transverse ridges of consequence; sculpture of well marked, rather flattish, spiral, close-set threads, sometimes with a single finer intercalary thread, overlaid by smaller rather compressed transverse ridges, in harmony with the incremental lines; on top of the spirals the ridges bulge like the threads of worsted on canvas embroidery; spire situated well forward and with subvertical sides; interior pearly, the coil of the spire rather close and the margin of the pillar flattened. Longitude of shell, 23; latitude, 18; altitude, 11.5; nucleus behind the anterior end, 17^{mm}.

HAB.—Station 2815, in 33 fathoms, sand; near Gharles Island, of the Galapagos group, in the Pacific.

The nearest relative of this shell is *H. parva*, from the Cape of Good Hope, which differs from our specimens chiefly in the greater prominence of the central rib, and in being a little more circular in outline.

The shell from the Galapagos agrees so exactly with what we know of *H. Pourtalesii* and with my own recollection of the type specimen destroyed in the Chicago fire, that I am unwilling to separate it, though the distance between the two localities is so great.

The occurrence of this shell at the Galapagos is of great interest apart from its supposed connection with the Floridian species. No species of *Haliotis* is known from the west coast of South America, of Central America, or of North America south of northern Mexico. There are one or two small not nearly related species in the Melanesian Islands and north Australia. So the present species is remarkably isolated. Nothing of the sort has been previously recorded from the Galapagos. Two specimens were obtained, neither containing the soft parts. The original type of *H. Pourtalesii* contained the animal. It would probably be referred to the section *Padollus*.

Family FISSURELLIDÆ.

Genus **PUNCTURELLA** Lowe.

Puncturella circularis Dall.

Collected at Station 2754, in 880 fathoms, ooze; east from Tobago; temperature 37°.9 F.

Puncturella falklandica A. Adams.

Collected at Station 2785, in 449 fathoms, mud, on the west coast of Patagonia; temperature 47° F.

This species is amazingly like *P. noachina*; the only differences I have been able to see in the shells are that in *P. noachina* the fissure is generally longer, the septum longer and less vertical, and the apex more posterior. The sculpture seems essentially similar. I have not been able to give the time necessary for a critical examination of the soft parts of the two forms. The animal of *P. falklandica* was remarkable in one respect. Among the specimens collected at this station, all of which possessed the soft parts, some had well pigmented black eyes, while in others the pigment was absent and the organs therefore must have been useless. The males possess a well marked verge in the vicinity of the right tentacle, thus adding to the now very respectable list of *Rhipidoglossa* which possess an intromittent male organ.

Subgenus FISSURISEPTA Seguenza.

Fissurisepta triangulata Dall.

Puncturella (Fissurisepta) rostrata Watson, Chall. Rep. Gastr., p. 48, Pl. IV, Fig. 10, 1885. Not of Seguenza.
Fissurisepta triangulata Dall, Bull. Mus. Comp. Zoöl., XVIII, p. 404, June, 1889.

HAB.—Station 2358, off Cozumel Island, coast of Yucatan, in 222 fathoms, coral; and Station 2668, off Fernandina, Florida, in 294 fathoms, gravel; temperature, 46°.3 F.

This species is more triangular and erect, less elevated and longer than Seguenza's original *rostrata*, with typical examples of which the present species has been carefully compared.

Subgenus RIMULA Defrance.

Puncturella (? Rimula) erecta Dall.

Puncturella erecta Dall, Bull. U. S. Nat. Mus., No. 37, p. 170, No. 1077, August, 1889.

Shell stout, erect, high, rather short, white or grayish, reticulated; apex minute; nucleus smooth, of a single whorl; radiating sculpture of three series of threads, the strongest alternating with the secondaries and these with the tertiaries, which last are almost hidden under the concentric sculpture, which consists of round, even, uniform, equally-spaced threads clinging closely to and passing over the radii like cords over a rod; apex at the posterior third, from which the posterior slope is straight and steep; anteriorly the top is arched, then falls steeply to the front edge; slit elongate, with its outer edges raised, a suture in front continued to the front edge, corresponding to an internal groove which does not indent the margin; perforation long and narrow, contained in the upper half of the anterior dorsum; internally there is no true septum, but a rim of shelly matter like a collar is pushed back behind the orifice as if the latter had been made by pushing a pin in from the outside and pressing it backward; interior of shell white, muscular impression strong, margin of shell slightly crenulated by the sculpture; maximum longitude of shell, 10; latitude, 7.5; altitude, 6.8^{mm}.

HAB.—Station 2601, in 107 fathoms, off Cape Hatteras, North Carolina; temperature, 67°.4.

This is one of those intermediate forms which bridge over the gaps between subgenera. It has exactly the sculpture of some varieties of *Cranopsis asturiana*, but its apex is smaller and more close-set, the form of the shell different, the perforation nearer the apex of the shell, and the shell itself is solid and strong, while the *C. asturiana* is delicate and thin. It is difficult to say whether the present species should be called a *Puncturella* (s. s.), a *Cranopsis* or a *Rimula*.

Subgenus CRANOPSIS Adams.

Cranopsis asturiana Fischer.

Collected at Station 2666, in 270 fathoms, sand, off Fernandina, Florida; and at Station 2750, in 496 fathoms, off St. Bartholomew, West Indies; temperature 48°.3 and 44°.4 F.

Genus **EMARGINULA** Lamarck.

Emarginula tumida Sowerby.

Collected at Station 2758, 90 miles southeast from Cape San Roque, Brazil, in 20 fathoms.

Subgenus SUBEMARGINULA Blainville.

Subemarginula octoradiata Gmelin.

Collected at Port Castries, Santa Lucia, West Indies, and at the Abrolhos Islands, near Porto Allegre, North Brazil.

Genus **FISSURELLA** Bruguière.

Fissurella alternata Say.

Not rare at the Abrolhos Islands, Brazil.

Subgenus GLYPHIS Carpenter.

Glyphis barbadensis Gmelin.

Collected at the Abrolhos Islands, Brazil.

Genus **FISSURELLIDEA** Orbigny.

Fissurellidea limatula Reeve.

Collected at Station 2765, in 10½ fathoms, sand, off the Rio de la Plata, from whence it ranges northward to the coast of North Carolina.

EXPLANATION OF PLATES.

When an asterisk is attached to a figure it indicates that the species was obtained in the Pacific Ocean. All those without an asterisk are Atlantic species. The figures following the name indicate the longest dimension of the actual shell represented as figured, in millimeters.

PLATE V.

FIG. 1. *Chrysodomus* (*Sipho*) *Rushii* Dall, 11.0; p. 323.
2. *Nassa scissurata* Dall, 12.0; p. 326.
3. *Conomitra intermedia* Dall, 15.5; p. 316.
4.* *Columbella permodesta* Dall, 14.0; p. 327.
5. *Mesorhytis costatus* Dall, 14.0; p. 317.
6.* *Chrysodomus griseus* Dall, 32.0; p. 322.
7.* *Pleurotoma? exulans* Dall, 32.0; p. 302.
8.* *Calliotectum vernicosum* Dall, 48.0; p. 304.
9. *Terebra benthalis* var. *nodata* Dall, 18.5; p. 299.
10.* *Chrysodomus amiantus* Dall, 76.0; p. 321.
11. *Mangilia antonia* Dall, 18.0; p. 304.

PLATE VI.

FIG. 1.* *Leucosyrinx Goodei* Dall, 80.0; p. 300.
2.* *Pleurotomella cingulata* Dall, 73.0; p. 306.
3.* *Leucosyrinx persimilis* Dall, 80.0; p. 301.
4.* *Pleurotomella* (*Gymnobela*) *agonia* Dall, 16.0; p. 301.
5.* *Pleurotomella argeta* Dall, 43.0; p. 307.
6. *Fusus ceramidus* Dall, 46.5; p. 318.
7.* *Chrysodomus aphelus* Dall, 30.0; p. 323.
8. *Nassarina columbellata* Dall, 12.2; p. 325.
9.* *Buccinum viridum* Dall, 46.0; p. 320.

PLATE VII.

FIG. 1.* *Murex* (*Chicoreus*) *Leeanus* Dall, 70.0; p. 329.
2.* *Calliostoma platinum* Dall, 32.0; p. 343.
3.* *Turcicula Bairdii* Dall, 50.0; p. 346.
4.* *Gaza Rathbuni* Dall, alt. 24.0; p. 342.
5. *Fusus æpynotus* Dall, 24.0; p. 318.
6. *Fusus alcimus* Dall, 15.0; p. 319.
7.* *Turcicula Macdonaldi* Dall, 75.0; p. 348.

PLATE VIII.

FIG. 1.* *Verticordia perplicata* Dall, 33.0; p. 278.
2. *Pecten glyptus* Verrill, right valve, 60.0; p. 248.
3. The same, interior, showing radii.
4. *Poromya cymata* Dall, 9.0; p. 289.
5. *Cuspidaria monosteira* Dall, 5.0; p. 281.
6. *Poromya microdonta* Dall, alt. 11.5; p. 290.
7.* *Lyonsiella radiata* Dall, 13.0; p. 276.
8.* *Poromya* (*Dermatomya*) *mactroides* Dall, 18.0; p. 291.
9.* *Cryptodon barbarensis* Dall, 17.0; p. 261.

PLATE IX.

FIG. 1.* *Dentalium megathyris* Dall, 95.0; p. 293.
2. Floating ovicapsule of *Scaphella ? brasiliensis* Sol.; 50 by 55^{mm}; p. 312.
3. *Solariella infundibulum* Watson, ♂, enlarged diagram of the soft parts, with the shell removed; the operculum *in situ*; p. 349.
4.* *Volutilithes Philippiana* Dall, 36.5; p. 313.
5. *Scaphella magellanica* Sowerby, larval shell, from ovicapsule dredged at Station 2779, enlarged; 11.0; p. 311.
6. *Scaphella magellanica* Sowerby, ovicapsule on valve of *Pecten*. The diameter of the base of the capsule is about 28.0; p. 311.
7. *Halistylus columna* Dall (much enlarged), 5.8; p. 341.
8.* *Cadulus albicomatus* Dall, 24.0; p. 295.

PLATE X.

FIG. 1. *Callocardia* (*Vesicomya*) *Smithii* Dall, interior of left valve, 28.0; p. 268.
2. The same, hinge of right valve.
3. The same, exterior of left valve.
4.* *Lophocardium Annettæ* Dall, 29.0; p. 264.
5.* *Callocardia guttata* A. Adams, 17 by 17.5; from a drawing by Mr. Edgar A. Smith of the unique type in the British Museum; p. 267.
6. *Callocardia* (*Callogonia*) *Leeana* Dall, 20.0; p. 269.
7. The same, hinge of right valve from below, old specimen, 35.0.
8. The same, left valve.
9. The hinge (Fig. 7), viewed from the left, right valve.
10.* *Malletia goniura* Dall, 15.5; p. 251.
11.* *Cymatoica occidentalis* Dall, 12.5; p. 272.
12. *Cymatoica orientalis* Dall, 9.5; p. 273.

PLATE XI.

FIG. 1. *Pteronotus phaneus* Dall, 17.0; p. 330.
2. *Pecten* (*Pseudamusium*) *strigillatum* Dall, 9.0; p. 250.
3. *Eupleura Stimpsoni* Dall, 12.0; p. 331.
4. *Crassatella floridana* Dall, 50.0; p. 260.
5. *Benthonella gaza* Dall, 8.0; p. 338.
6. *Marginella cineracea* Dall, 14.0; p. 310.
7. *Mitra Bairdii* Dall, 35.0; p. 315.
8. *Scala babylonia* Dall, 30.0; p. 332.
9. *Pecten effluens* Dall, 26.0; p. 249.
10. *Peristichia toreta* Dall, 10.75; p. 334.
11. *Cyclostrema cistronium* Dall, alt. 1.6; p. 354.

PLATE XII.

FIG. 1.* *Haliotis Pourtalesii* Dall, upper surface, a calcareous foraminifer adhering near the margin of the aperture; 23.0; p. 355.
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8. *Solariella actinophora* Dall, alt. 7.25; the aperture is somewhat broken on the base; p. 353.
9.* *Nassa Townsendi* Dall, 10.0; p. 326.

10.* *Pleurotomella suffusa* Dall, 31.5; p. 308.
11. *Solariella actinophora* Dall, view from above; maximum diameter, 9.0. In the figure the radiations lying between the suture and the first spiral rib are not represented as sufficiently numerous or conspicuous on the last whorl; p. 353.
12.* *Scaphander interruptus* Dall, 33.0; p. 297.

PLATE XIII.

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4. *Malletia* (*Tindaria*) *acinula* Dall, 5.0; p. 253.
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5*b*. *Leda pontonia* Dall, side view, 14.5; p. 257.
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10. *Malletia* (*Tindaria*) *agathida* Dall, 5.5; p. 252.
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3. *Cryptodon ovoideus* Dall, 25.0; p. 263.
4. *Nucula Verrillii* Dall, 5.0; p. 257.
5. *Semele nuculoides* Conrad, 5.0; p. 274.
6. *Lucina leucocyma* Dall, from above; p. 263.
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8. *Veneriglossa vesica* Dall, front view of right valve, 21.0; p. 270.
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11. *Lucina sagrinata* Dall, 7.6; p. 263.
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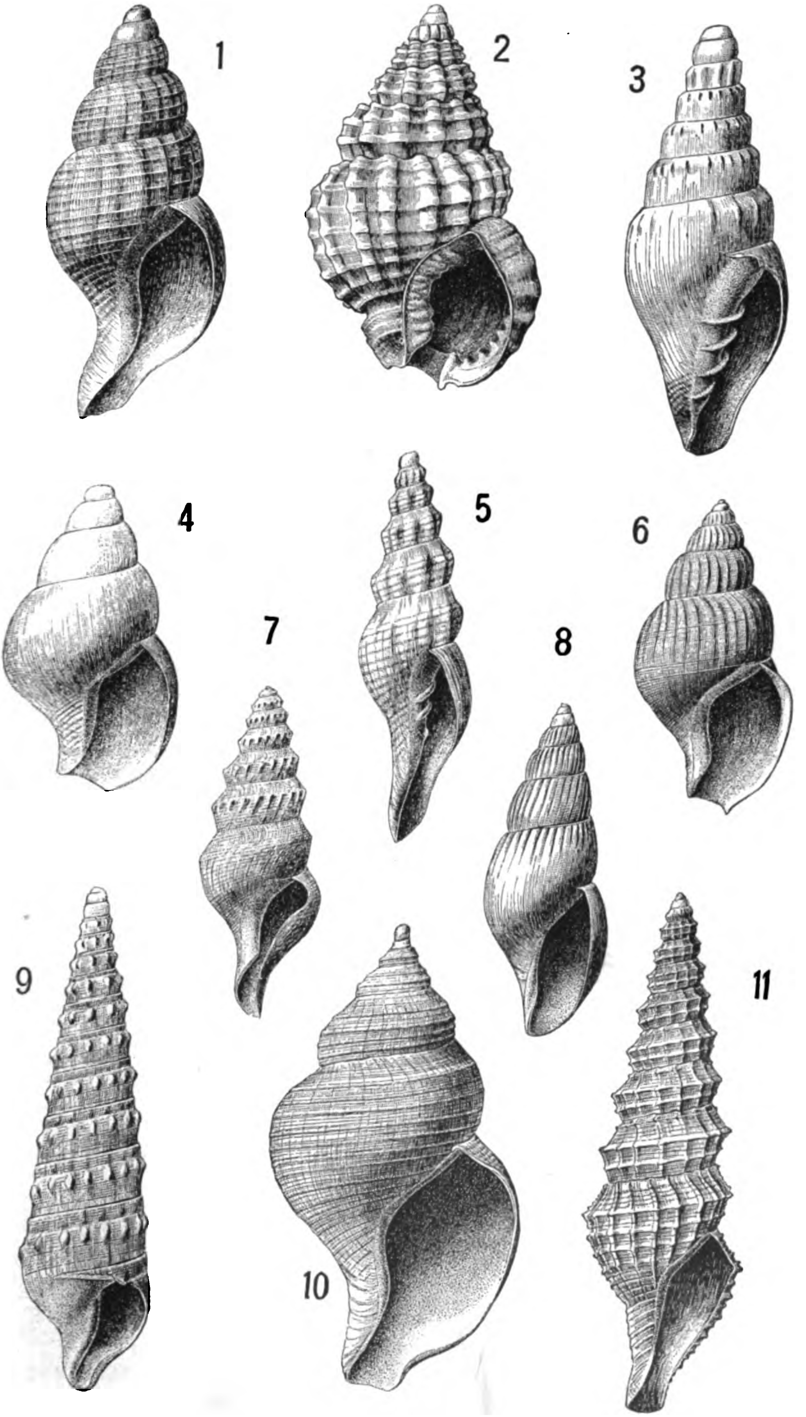

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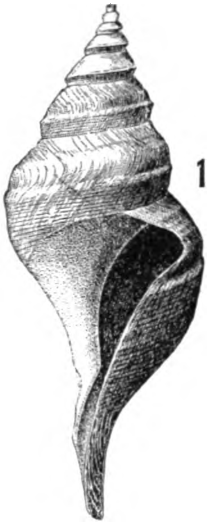
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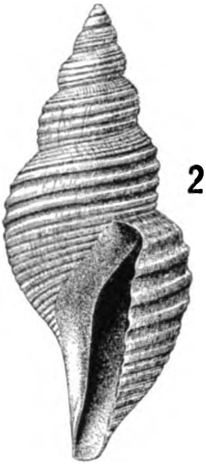
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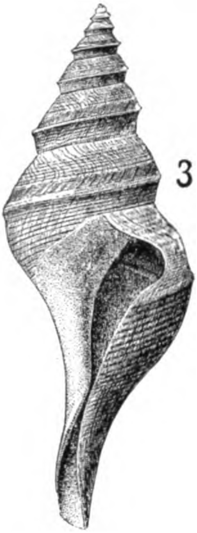
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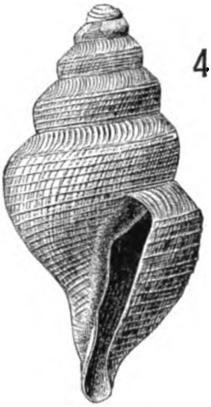
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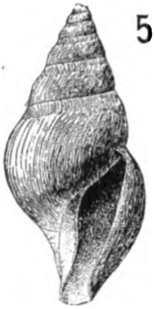
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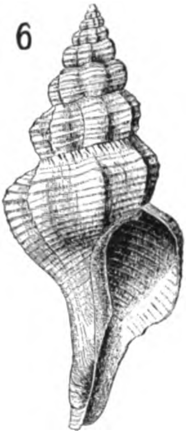
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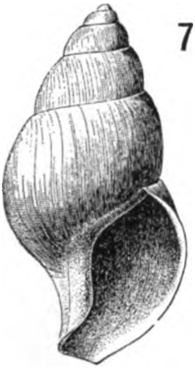
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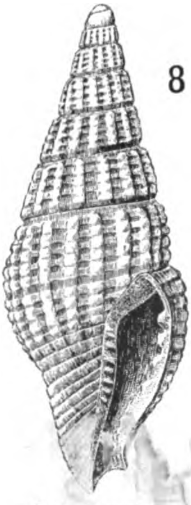
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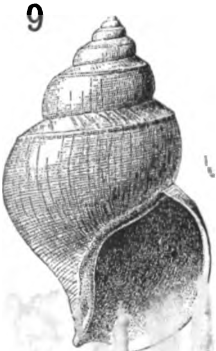
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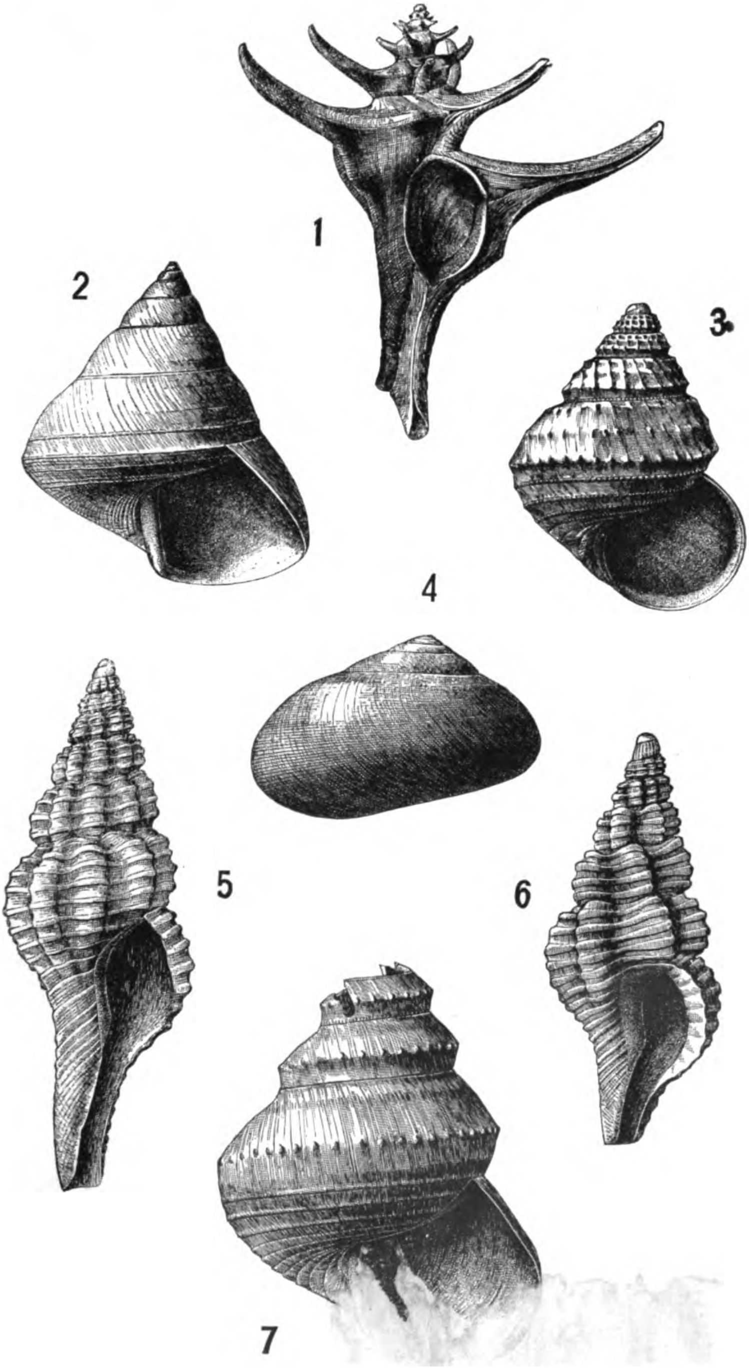

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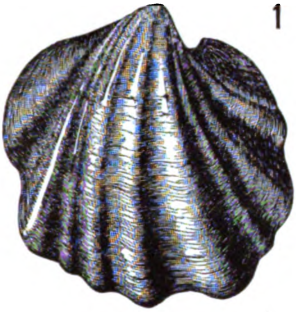
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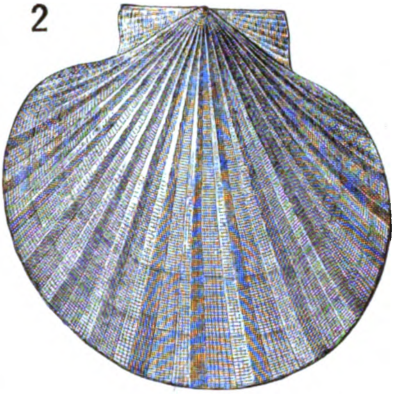
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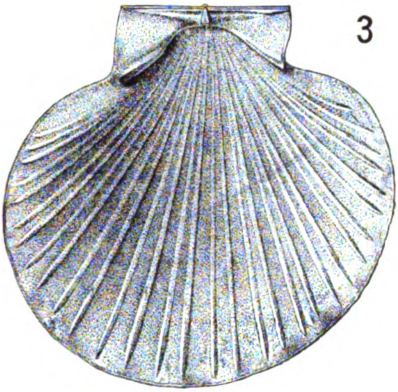
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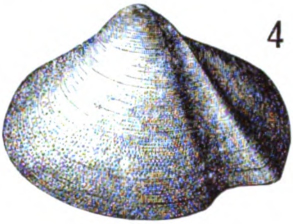
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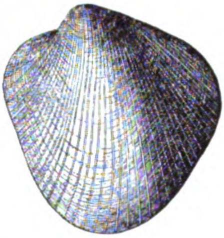
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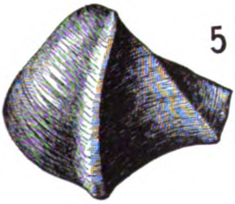
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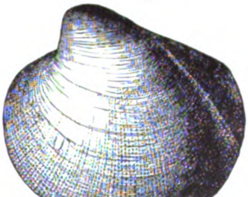
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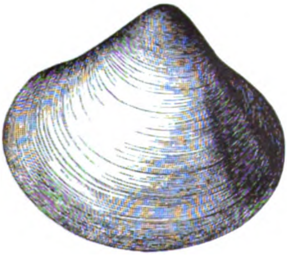
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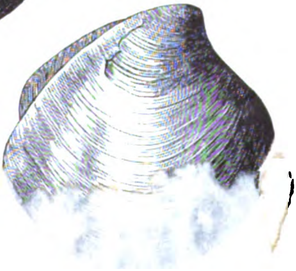
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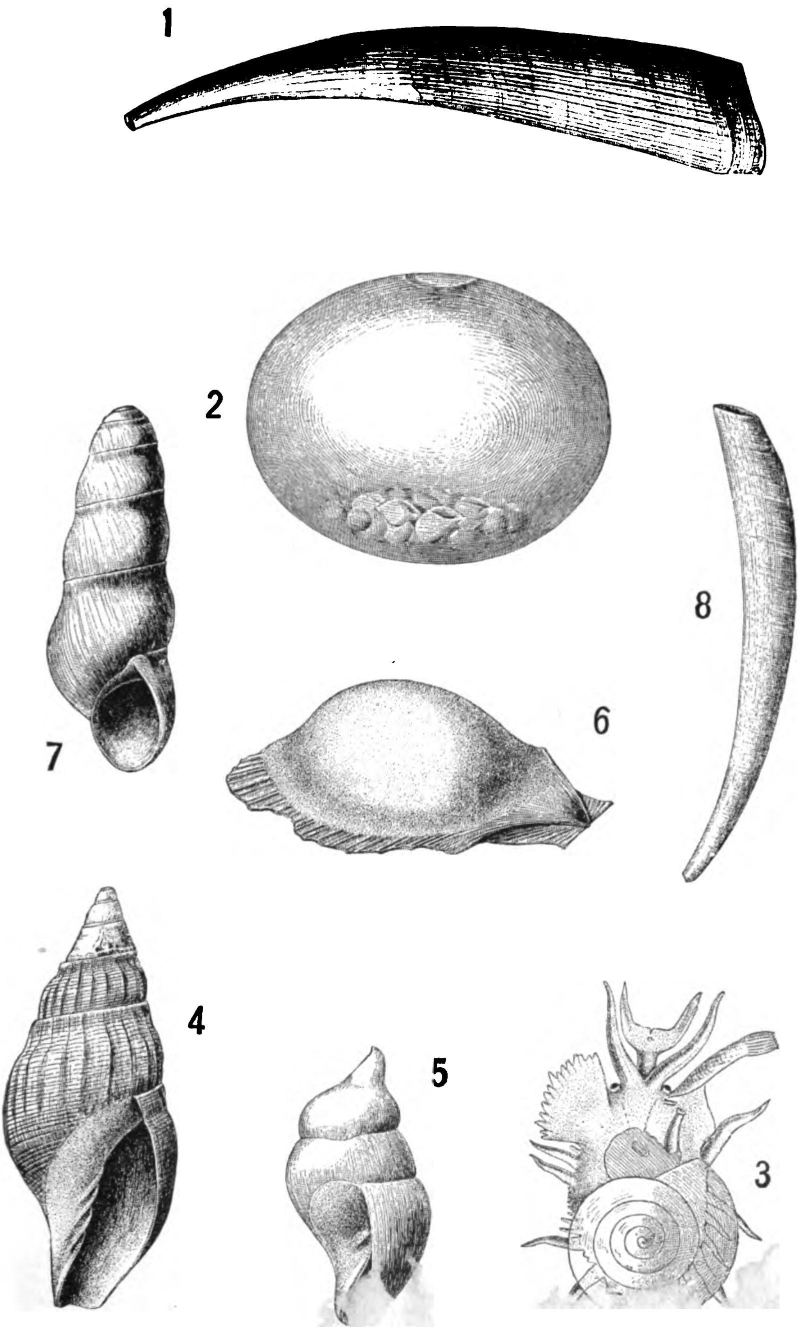

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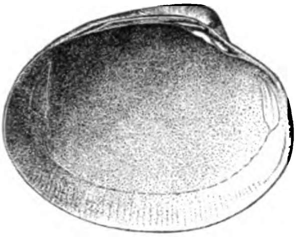

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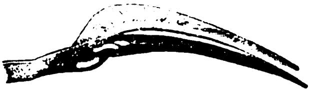

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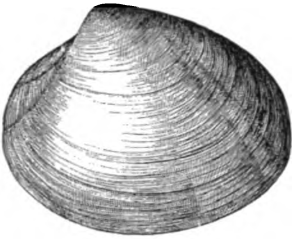

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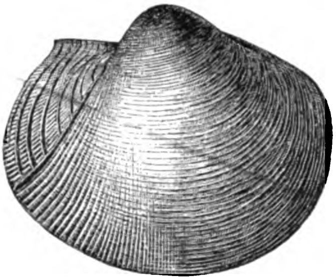

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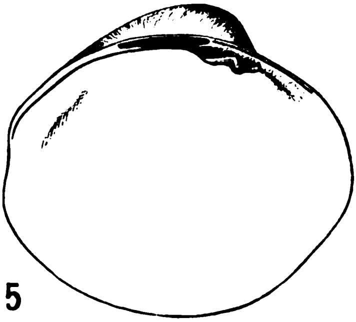

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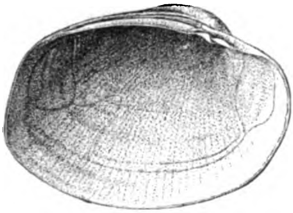

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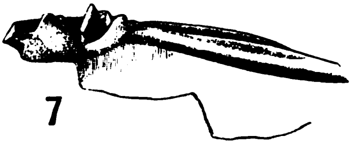

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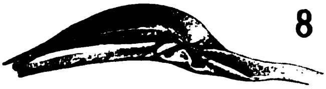

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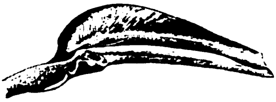

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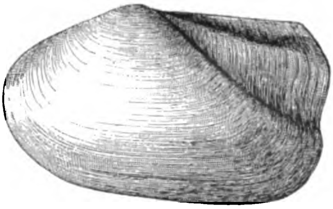

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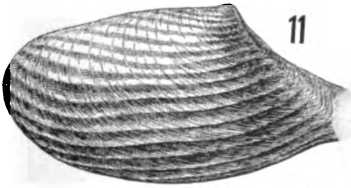

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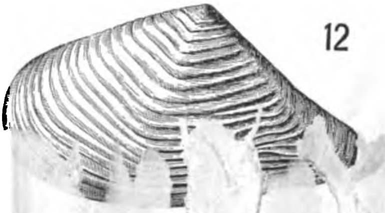

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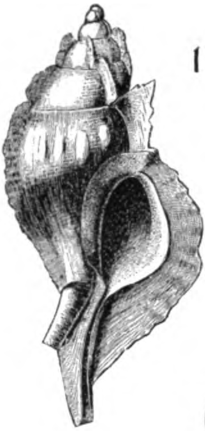
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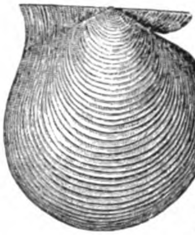
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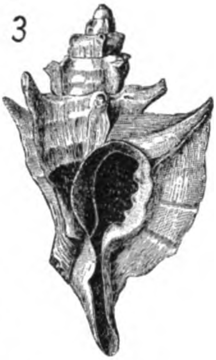
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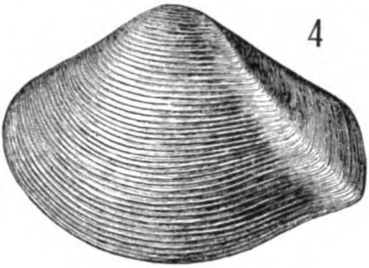
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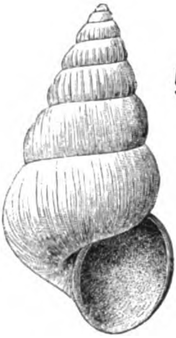
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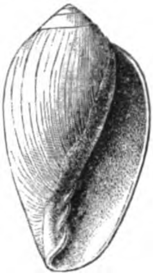
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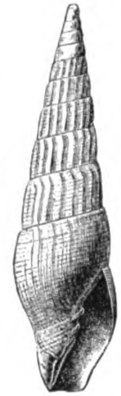
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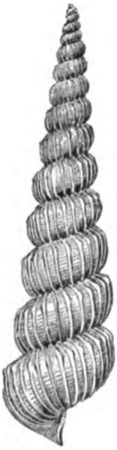
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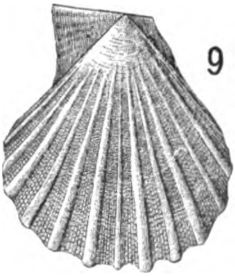
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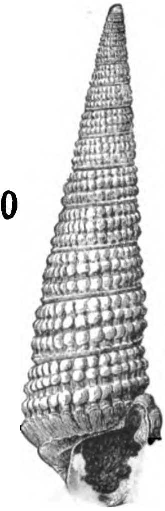
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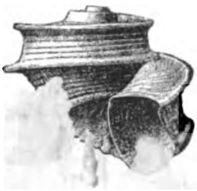
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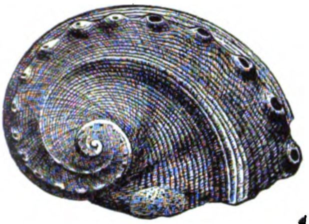
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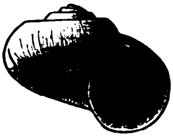
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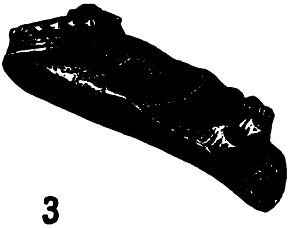
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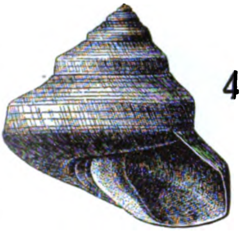
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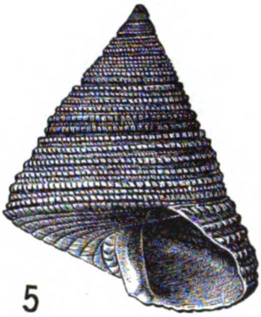
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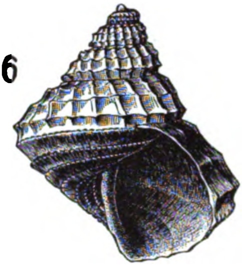
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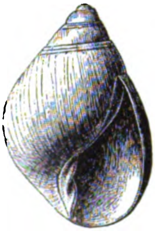
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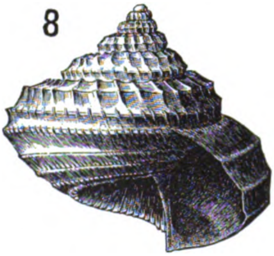
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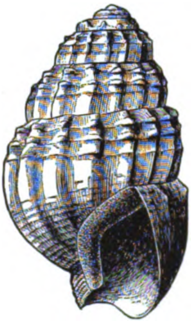
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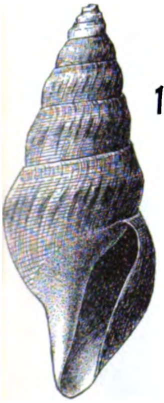
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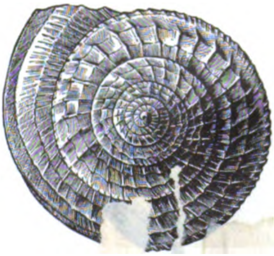
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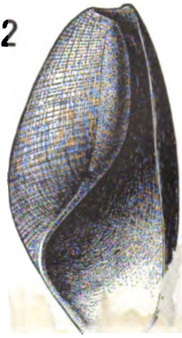
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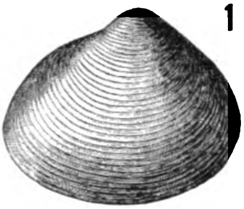
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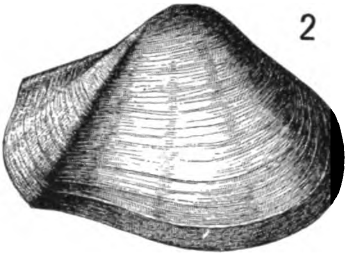
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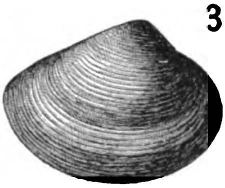
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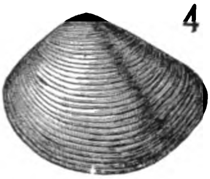
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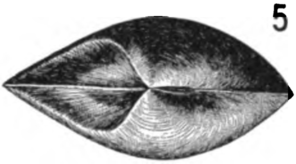
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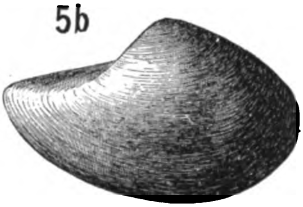
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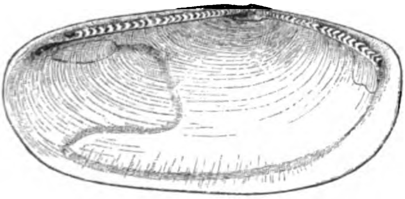
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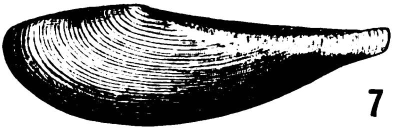
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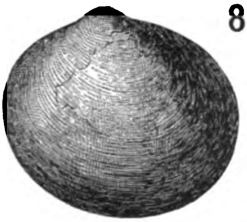
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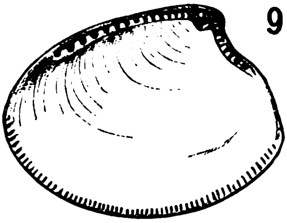
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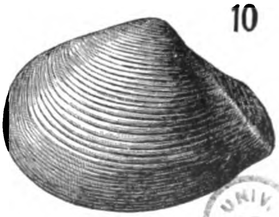
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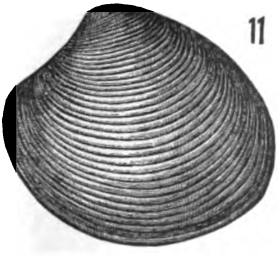
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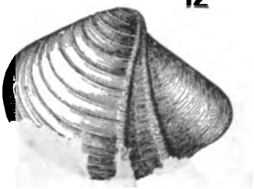
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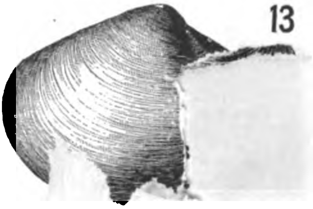
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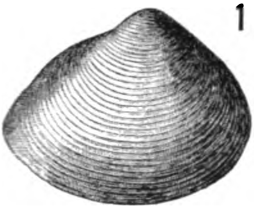
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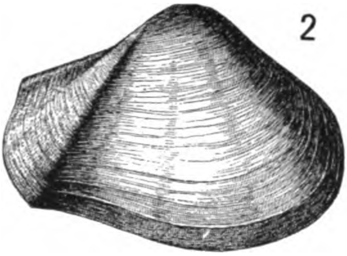
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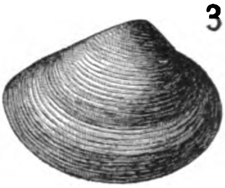
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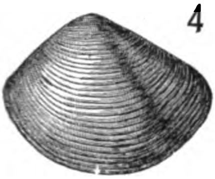
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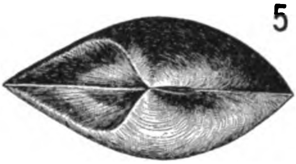
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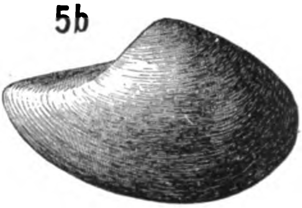
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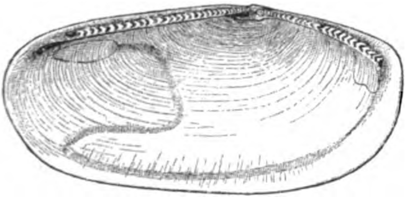
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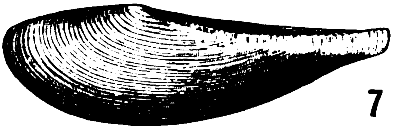
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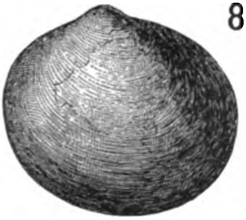
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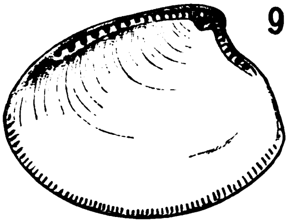
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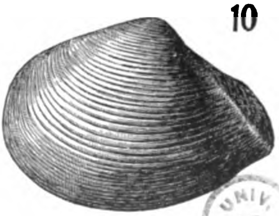
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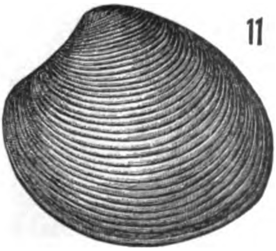
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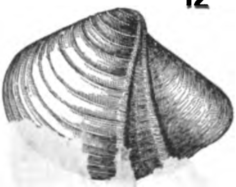
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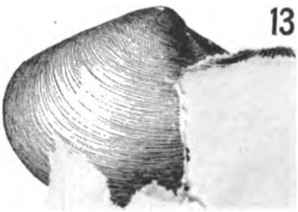
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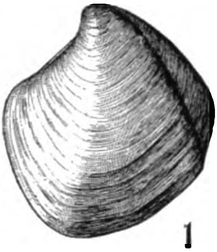
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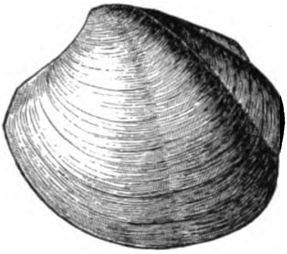
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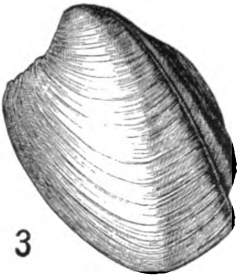
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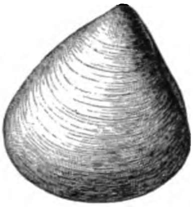
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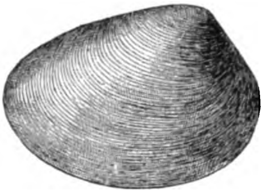
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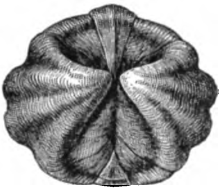
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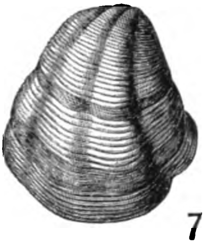
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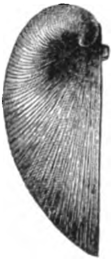
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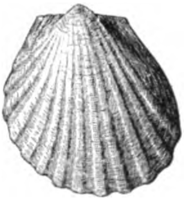
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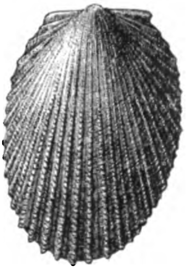
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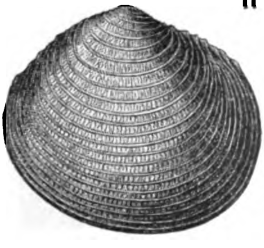

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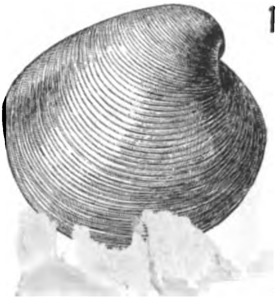

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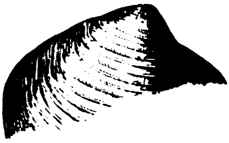

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NOTES ON THE OCCURRENCE OF GILLICHTHYS Y-CAUDA AT SAN DIEGO, CALIFORNIA.

BY

CHARLES H. GILBERT.

Professors Jenkins and Evermann have recently described from Guaymas, Mexico, a very interesting Goby (*Gillichthys y-cauda*), distinguished, among other points, by having but five dorsal spines. The extension of the range of this species to include the entire Gulf of California region was to be looked for, but its discovery as far north as San Diego was unexpected. On examining recently a bottle of small Gobies (No. 24866), labeled *Gillichthys mirabilis*, collected by Jordan and Gilbert in 1880, at San Diego, I found the collection to consist in equal parts of *Gillichthys y-cauda* and *Lepidogobius gilberti*, the latter a species recently described by Mr. C. H. Eigenmann from San Diego Bay.

A second lot (No. 34904), collected by Mrs. C. H. Eigenmann, contains the same two species, which must be about equally abundant at San Diego.

In all specimens of *G. y-cauda* examined, including the types, I find the dorsal V-15 or 16, the anal 14 or 15. *G. guaymasiæ* Jenkins and Evermann, also from Guaymas, has the same number of fin rays, the types in the Museum showing D. V-16; A. 14. I can discover no important difference between the two species in general proportions, or in size of eye and mouth, and am in some doubt as to their distinctness, although they seem to differ somewhat in coloration.

An examination of the types of *Gobius townsendi* Eigenmann and Eigenmann, has shown it to be based on the young of *Gillichthys mirabilis*. In the largest specimens the elongation of the maxillary has become evident. The fin-formula of *mirabilis* is D. VI-12 to 14; A. 12 or 13.

U. S. FISH COMMISSION, *August* 28, 1889.

DESCRIPTION OF A NEW GENUS AND SPECIES OF INARTICULATE BRACHIOPOD FROM THE TRENTON LIMESTONE.*

BY

CHARLES D. WALCOTT,

Honorary Curator of the Department of Invertebrate Fossils.

Among the fossils collected by Mr. William P. Rust, in the vicinity of Trenton Falls, New York, I discovered two specimens of a small conical shell closely related in form to *Acrotreta subconica* Kutorga.† The study of these in connection with one that I found at the same locality in 1874 leads me to consider the shell to belong to a new genus and species of the family *Siphonotretidæ.* For it I propose the name *Conotreta rusti.*

CONOTRETA gen. nov.

In external form the conical or dorsal valve is similar to that of *Acrotreta gemma.* The flat valve is unknown. In *Acrotreta* there is an elongated muscular scar extending from each side of the siphonal tube obliquely forward. In *Conotreta* five narrow ridges radiate from the apex towards the front, as shown in figures 1 and 2. The central ridge joins the thickened apex, which, judging from the same characters in *Acrotreta gemma*, was perforated by a siphonal tube. Structure calcareo corneous.

Type, *Conotreta rusti.*

Conotreta rusti sp. nov.

Larger or dorsal valve more or less acutely conical, rounded—subtriangular at the margin of the valve; false area nearly flat, narrow and grooved at the center by a longitudinal, narrow, shallow furrow; probably perforate at the apex. Surface marked by concentric lines of growth that pass uninterruptedly over the false area.

The cast of the interior of the conical valve shows six narrow, elongate ridges radiating from the apex, that separate five depressions on the sides and front of the shell. With this structure the interior of the shell would have five radiating ridges gradually widening out from the apex and becoming hollow towards their outer ends. The cast of the interior of the shell, near the apex, shows that one of the ridges joined a thickened portion of the shell that was probably the support of the siphonal tube, as in the genus *Acrotreta*.

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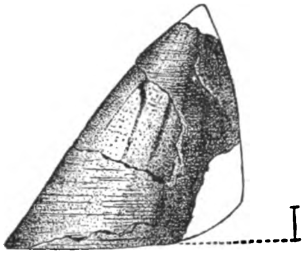
*Read before the Biological Society of Washington, November 30, 1889. Advance sheets of this paper were distributed December 10, 1889.

†Ueber die Brachiopoden-Familie der Siphonotretææ, p. 28, pl. 7, fig. 7. Verhandl. Kaiserl. Min. Gesellschaft, St. Petersburg, 1848.



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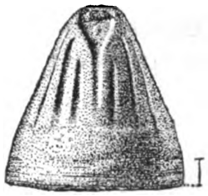

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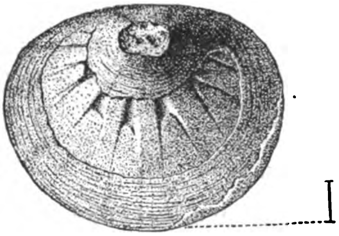

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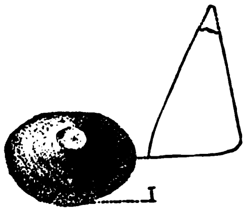

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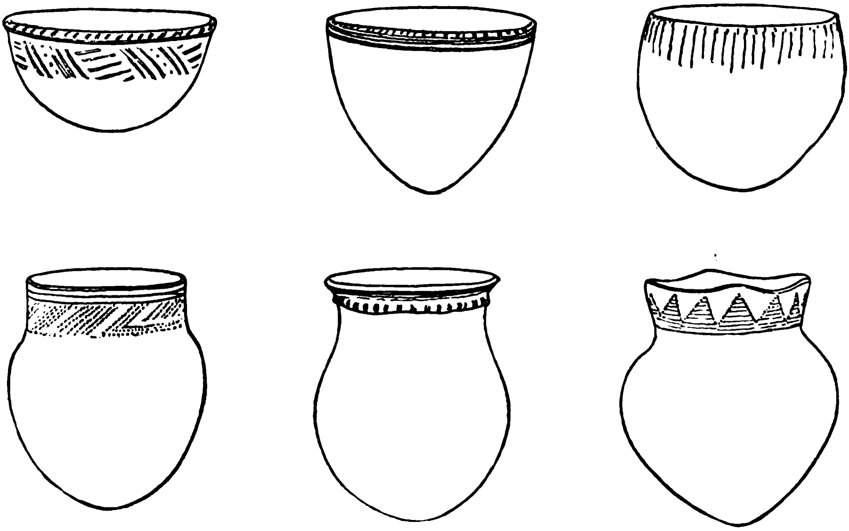
1. Side view of the partial cast of the interior. Greatly enlarged.
2. Summit view of fig. 1, to show the character of the cast of the interior surface exposed. The apex is broken off.
3. Front view of another specimen that shows the cast of the ridges on the interior of the shell, and the thickened apex.
4. A more acutely conical shell, associated with the preceding.

The conical form varies considerably. One of the specimens is relatively one-third broader at the base than the other that otherwise is identical with it.

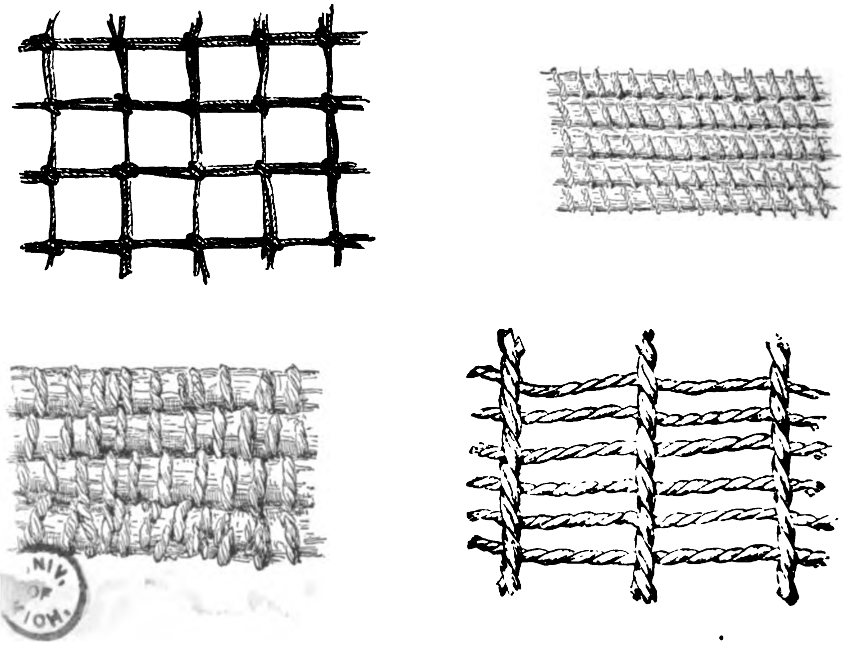
Two of the specimens are in the U. S. National Museum collections; the third is from the Museum of Comparative Zoology, Cambridge, Massachusetts.

The specific name is given in recognition of the long-continued services of Mr. William P. Rust, in collecting the Trenton fauna of central New York.

Nat. Mus. Cat. No. 18443.



Types of Form, Pottery of the Potomac Valley.



NIV. OF ...IOH.

Examples of Fabrics impressed upon Pottery of the Potomac Valley.

THE ARCHÆOLOGY OF THE POTOMAC TIDE-WATER REGION.

BY

OTIS T. MASON,
Curator of the Department of Ethnology.

(With Plates XV–XIX.)

The U. S. National Museum has undertaken to publish a series of bulletins upon the natural history of the region around Washington. Already the birds and plants have been studied and the results given to the world.

The natural history of any region includes its human fauna, and the series of bulletins under consideration would be incomplete without an account of the peoples that have here resided. Our business in this brief introductory chapter is with the aborigines. And, since it is not possible to confine the inquiry to the ten miles square called the District of Columbia, the Potomac drainage shall be the ground covered. Even this region must be narrowed, for we shall ascend no tributary further than those rapids that mark the limit of tide-water, and mark also the location of the principal cities, such as Georgetown, Fredericksburgh, Richmond, etc.

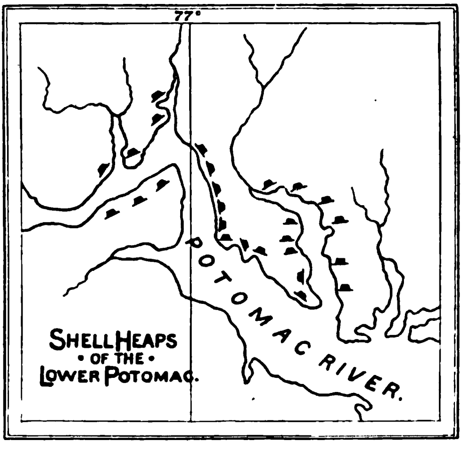
In time, our limit shall be the end of the first half of the seventeenth century on the hither side, but the other limit shall be pushed far enough back to admit all of those geological inquiries that have become involved with the history of man.

It is possible to commence our study at either limit, taking up, first, either the geology of what is called the Columbian period or studying the last Indian tribes that left this arena just after the settlement of the royalists in Virginia and the Catholics in Maryland. For the purposes of elimination the latter plan will be adopted.

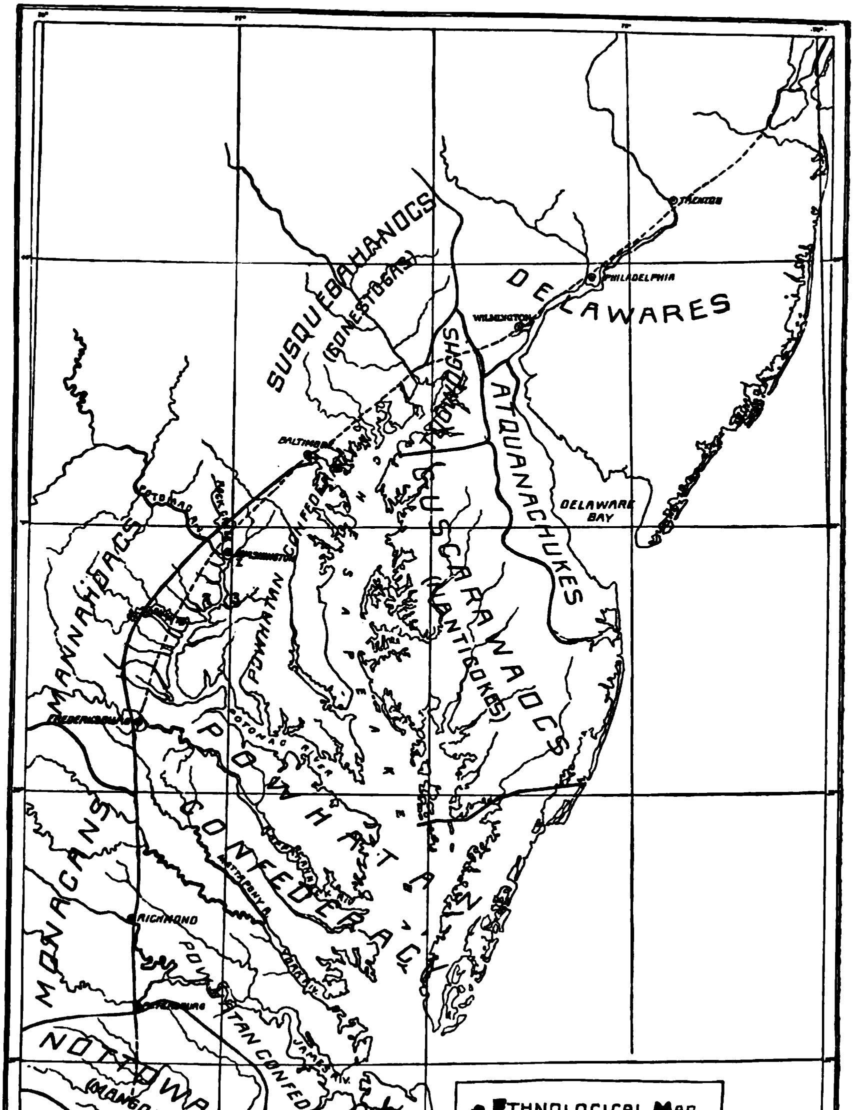
The tribes of Indians along the Potomac tide-water region have been well studied by Mr. James Mooney, and his map, which is here produced (see Plate XV), shows their locations and boundaries.

The central portion of the area was the home of the Powhatan confederacy, belonging to the great Algonkin stock, which rivaled in extent the domain of Charles the Sixth. On the north and the south they were harassed by members of the Iroquoian stock, while on the west and just above the line of cascades wandered the Mannahoacs and Monacans, of unknown stock, but for many reasons believed to belong to the Dakotans.

Only a few years after the white occupation of the Potomac Valley did the Indians remain. Save such miserable remnant as are now to be seen at Pamunkey, in Virginia, they were driven off by the early settlers, leaving but two foot-prints—the shell-heaps and the dwelling sites. The Chesapeake Bay is salt water and is the home of the oyster, where the supply of this valuable food product is still abundant. The brackish water of sufficient saltness to suit the oyster extends up the Potomac River to within 50 miles of Washington. Consequently, from the point named to the mouth of the river, wherever there was a cove adapted to the abundant growth of the oyster, there camped the Indians and left shell-heaps, which in some places are of enormous extent. It is fortunate that we have among our scientific explorers in Washington Dr. Elmer Reynolds, who has lost no opportunity in examining the Potomac shell-heaps. A map of a portion of the Potomac, prepared by Dr. Reynolds to show the frequency of the shell-heaps along those portions of the river favorable to the growth of the oyster, is here given.



In the fresh-water portion of the lower Chesapeake drainage—that is, in the region between salt water and the cataracts—stone implements are found in the greatest profusion. It is easy to account for this, when it is remembered that the whole country hereabouts furnished abundant natural food supply. All the old local historians go into ecstasies over the shad, herring, sturgeon, wild duck, turkey, and deer, not to mention the great variety of small game, grain, fruit, and maize. To one accustomed to exploration among the mounds of the Ohio Valley or in the West Indies the stone implements are in appearance disappointing. While here and there polished axes are found, the polished implement is the exception, not the rule, especially on higher ground.



1. Nacochtank (Anacostia). 2. Tauxenent (Mt. Vernon). 3. Moyaones.

LOCATION OF INDIAN TRIBES IN 1607.

Again, comparing the chipped implements with those from regions abounding in flint, obsidian, and the finer varieties of the silex group, a large collection of them has a somewhat rude appearance. (See Plates XVI and XVII.) All this is due, however, to the material. The ancient Potomac dweller was restricted in his material to bowlders of quartzite found in quantities inexhaustible all over his area, to veins of milky quartz outcropping here and there, and to an occasional quarry of soapstone. It is not meant to be here asserted that all Potomac implements are made of these materials and are rude, because there exist in some of our local collections specimens of exquisite workmanship from finer substances.

A map, originally prepared for the Smithsonian Institution by Mr. Louis Kengla, is herewith appended. (See Plate XVIII.) This has been perfected to date for the writer by Mr. S. V. Proudfit, who is most familiar with the location of camp-sites, workshops, etc., around Washington.

In addition to the collection of the Smithsonian Institution there are many private cabinets of great value illustrative of this part of the subject, notably those of Mr. Mann S. Valentine, in Richmond; J. D. McGuire, esq., of Ellicott City; Mr. O. N. Bryan, of Piscataway, Md.; and in Washington, of Mr. S. V. Proudfit, Dr. Elmer R. Reynolds, Dr. W. J. Hoffman, Hallet Phillips, esq., Messrs. Ernest Shoemaker, De Lancy Gill, F. D. Finckel, and Nathaniel S. Way.

Our knowledge of the culture status of the peoples of this region is considerably enlarged by the discovery of earthenware which, though mostly in a fragmentary state, serves perfectly, when placed beside the ceramic products of other sections of the country, as an index of comparative advancement. A study of the distribution of the varieties of ware promises to assist materially in settling questions of tribal distribution.

Mr. W. H. Holmes has made a careful study of this field, and has, in addition, by taking casts from impressions upon the pottery, restored a number of the primitive woven fabrics of the tide-water people. Plate XIX gives a number of illustrations of the forms and ornaments of the pottery and four examples of the weaving.

The most serious problem that faces the archæologists in this area has been proposed by Mr. Thomas Wilson, of the Smithsonian Institution. It is no other than that of existence of two periods of occupation in the Potomac region—the one palæolithic and ancient, the other neolithic and modern. As the present writer understands the question, the facts are as follows: While the camp-sites along the water-courses yield abundance of finely-chipped arrow-heads, spear-heads, knives, etc., and also polished implements, soapstone vessels, and pottery, the hills back from the river are wanting in the smaller, finer forms, but abound in coarser, flaked *artefacta*, mixed with broken implements and spalls.

To render the question more intricate, the coarse "turtle-back" or "palæolith" is also found among the finer implements of the low lands, and the finer implements occasionally are found in these upland sites thought to be palæolithic.

The question is now fairly up for examination and discussion, and it is being discussed with all the zeal which the advocates of the two theories can exert. It is to be seen whether Piney Branch hill and the other hill finds are workshops and the rude suburbs of the more wealthy and refined lowlanders, or whether in the presence of these rude, flaked pieces we are looking upon the earliest devices of a people that existed and passed from this valley many thousands of years before it was inhabited by John Smith's Indians.

The last problem to be taken up is that which relates to geology. We are fortunate in this matter to have the guidance of Prof. W. J. McGee, who is both geologist and archæologist and has studied quaternary formations especially. As yet the question of relics deep down in the gravels has not arisen here. The problem of palæolithic man is rendered the more difficult by the fact that the formation of the crust compels us to look for his relics on the surface or in the loam, and not as in other locations beneath the soil.

Combining the researches of the geologist, the prehistoric archæologist, and the historian, it is designed by the technical section of the Anthropological Society to reconstruct the aboriginal record of the Potomac tide-water as the introductory chapter to the occupation of the region by the whites.

NOTE.—While this paper was passing through the press Mr. William H. Holmes made an extended investigation of the so-called Palæolithic Hill on Piney Branch, and his results will be found in the January number of the American Anthropologist for 1890.

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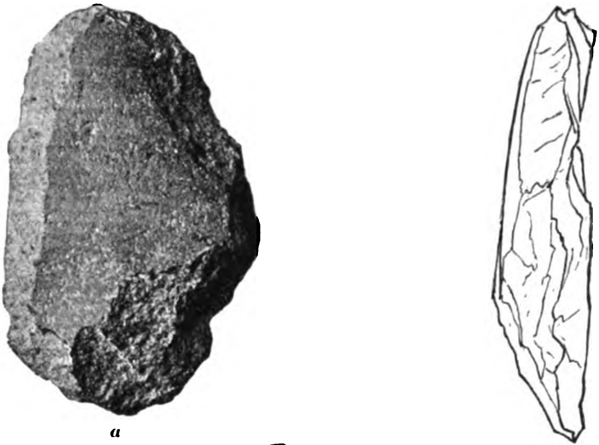

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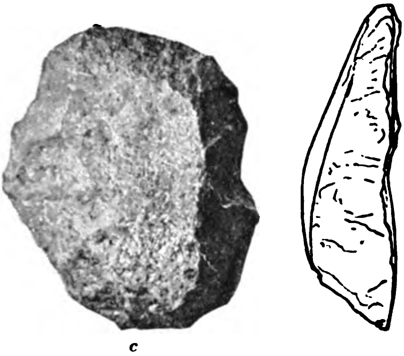

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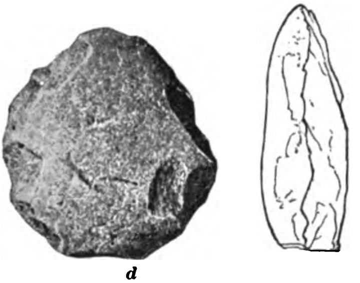

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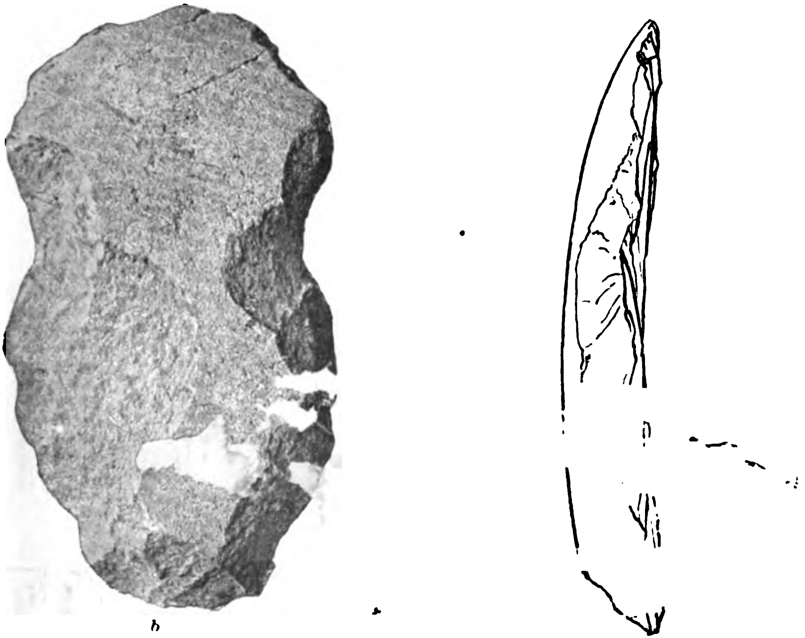

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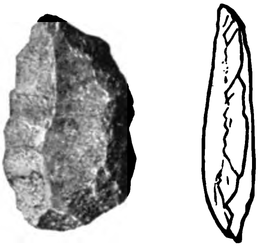
RUDE CHIPPED IMPLEMENTS FROM THE DISTRICT OF COLUMBIA.

(Half natural size.)



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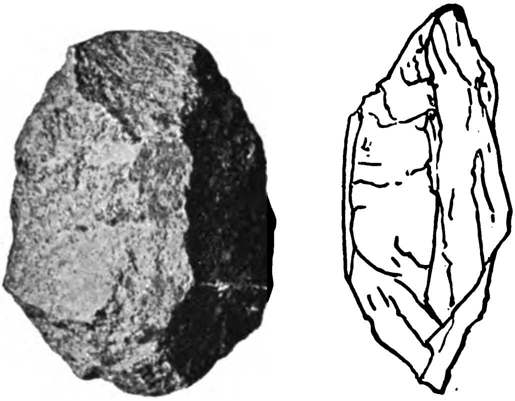

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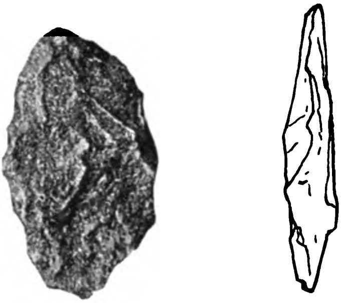

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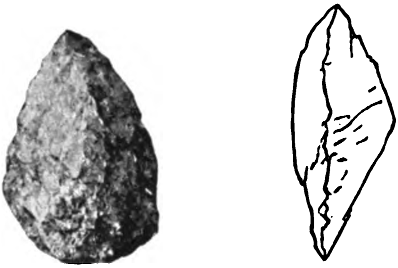

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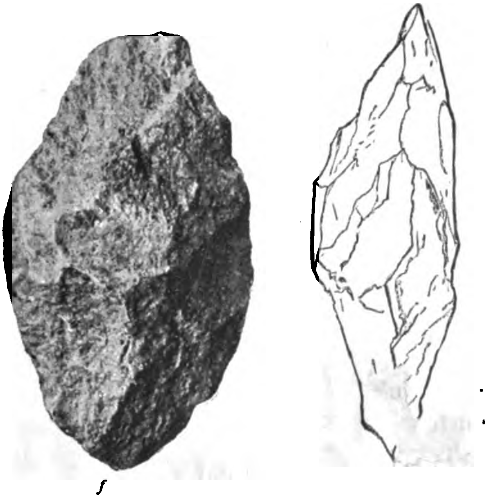

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RUDE CHIPPED IMPLEMENTS FROM THE DISTRICT OF COLUMBIA.

(Half natural size.)

THE PALÆOLITHIC PERIOD IN THE DISTRICT OF COLUMBIA.[*]

BY

THOMAS WILSON,

Curator of the Department of Prehistoric Anthropology.

(With Plates XVII–XXI.)

During the thousands of years covered by the historic period the world has remained in ignorance of the prehistoric races of man which occupied the territory now belonging to our civilization. Although prehistoric implements and monuments were widely disseminated, and to be seen on every hand, yet they remained unrecognized.

In the first decade of the nineteenth century the Danish savants, in their study of the Runic characters belonging to the early history of their country, discovered evidences of a human occupation earlier than any previously known. Their investigations developed facts which were accepted by the world at large, and the prehistoric ages of man were soon classified as the ages of stone, bronze, and iron. The Stone Age was afterwards subdivided into the palæolithic or ancient and neolithic or recent periods. In the United States the Iron Age belongs entirely to history, and the Bronze Age, as such, had no existence. Our American Indian when found by the European was in the neolithic stage.

The question to be briefly considered here[†] is the existence of the palæolithic period of the Stone Age in the District of Columbia.

It is not every chipped stone that belongs to the palæolithic period. The implements of this period are of a particular type and have individuality of form, so that the expert can distinguish them from implements of subsequent epochs or periods even when of similar material and mode of manufacture.

The question under discussion is one of great importance, for it involves the existence of a people quite unknown, and their occupation of our country at a period in antiquity hitherto unsuspected. I grant that evidence of this period in Europe does not prove a like period in America. The problem in each continent must be worked out from independent evidence. No mere theory governing this conclusion in Europe should govern in America; but if the evidence that has proved the proposition in Europe is found in America, then it should be entitled to the same weight.

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[*] Read before the Anthropological Society of Washington, May —, 1889.

[†] This paper is an abstract of an article on "the Palæolithic Period in the District of Columbia," not yet published.

It is a fact, important in this discussion, that in those European countries most occupied by palæolithic man implements kindred to those found in the river gravels and belonging to the same epoch have been found *on the surface* associated with objects of subsequent periods.

In investigating evidence of the existence of a palæolithic period in America the first question is—admitting, as we must, the existence of such a period in Europe—do we know any reason why it might not have existed in America? I can see no reason. If similar implements are found in America and in Europe, if they are found in similar positions and under similar conditions, I know of no reason why they should not establish, or at least point to, the same conclusion in America as in Europe.

In America, as in Europe, our only knowledge concerning the palæolithic period is necessarily derived from the implements themselves and from their position and surroundings when found. We have neither oral nor written evidence, nor have we tradition, concerning the implements or the people who made and used them. They belong to a period of geologic time which our most definite knowledge in America connects, as at Trenton, with the second glacial epoch.

Palæolithic implements have been found in the United States which correspond in every particular with those of Western Europe—correspond in form, appearance, material, mode of manufacture; in short, they are the same implements in every essential. They have been found under substantially the same conditions—sometimes on the surface, sometimes deep in the river gravels. We have heard from Mr. McGee how these implements were embedded in the river gravels at Trenton, and his opinion is that their antiquity dates to the glacial epoch.* Little Falls, Minnesota; Jackson county, Indiana; Claymont, Delaware; Loveland, Ohio, and other localities tell the same story and furnish the same evidence.

These finds of proved antiquity are in great numbers, and they demonstrate both the existence and the antiquity of a palæolithic period in America. This can not longer be doubted. It is the conclusion of all the scientists who have studied the question. I have mentioned Professor McGee. It goes without saying that Dr. Abbott believes it. Professor Putnam was one of its earliest believers. Professors Wright and Haynes have given it their adhesion, and so have all the geologists who have examined the localities where the implements have been found. Professor Haynes, of Boston, prepared Chapter VI, entitled "The Prehistoric Archæology of North America," and just published in the Narrative and Critical History of America, page 329. He, with Pro-

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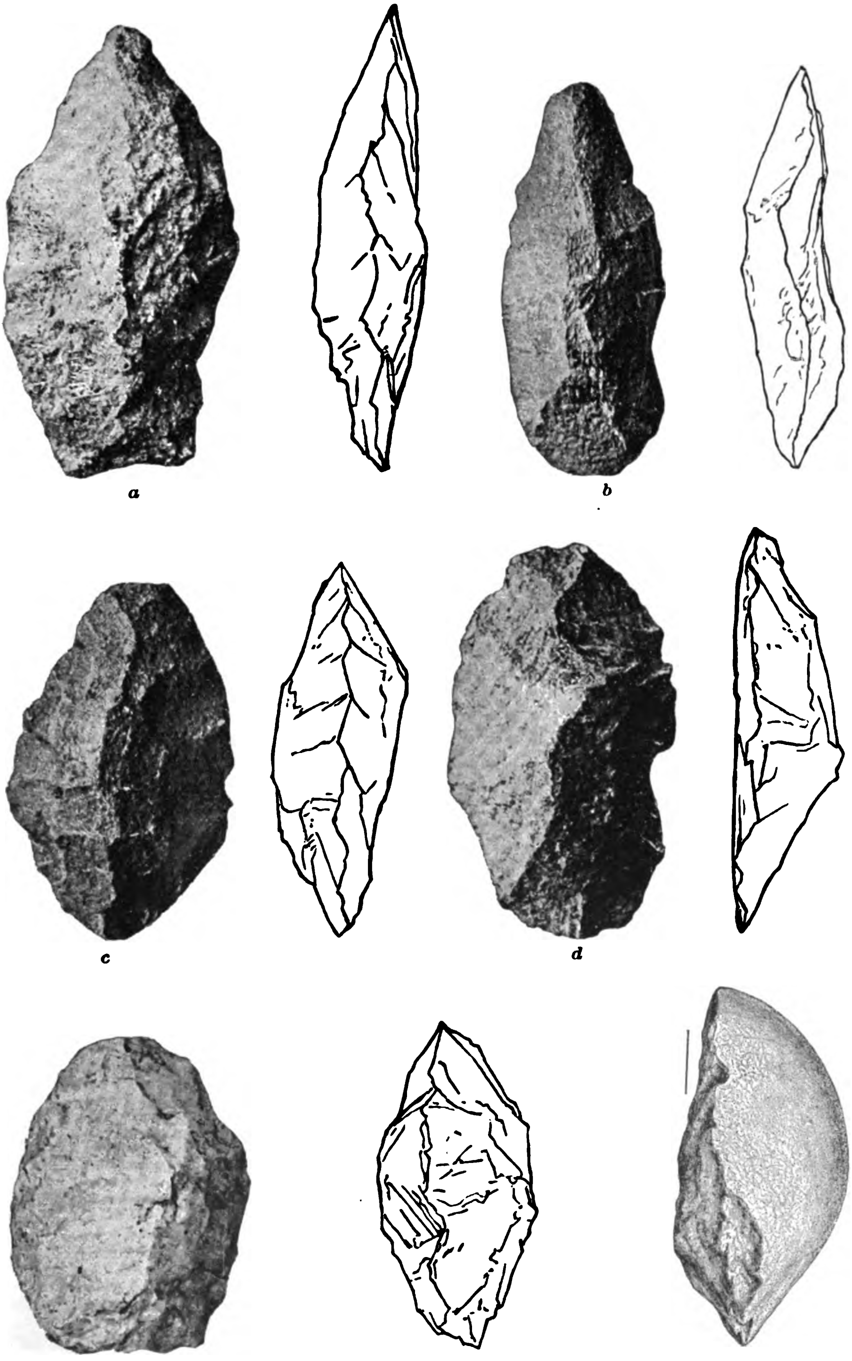
* See also his article in Popular Science Monthly, XXXIV, 1888.



PALÆOLITHIC IMPLEMENTS FROM THE DISTRICT OF COLUMBIA.
(Half natural size.)

fessor Putnam, recognized the great importance of the finds of these palæolithic implements by Dr. Hilborne T. Cresson at a depth of several feet in the undisturbed ancient gravel terrace of the Delaware River, near Claymont, Newcastle county, Delaware. The artificial origin of these implements appears upon inspection. They repeat (Plates XVIII, XXI) the punch marks (fig. *e*, Plate XX) the hammer strokes, the conchoidal fracture, all of which combine to shape them for a general purpose and to show conclusively that they are the work of man. It is the repetition of these items of testimony in hundreds and even thousands of specimens that makes the evidence so convincing.

Mr. McGee, in his article on "Palæolithic Man in America," in Popular Science Monthly, XXXIV, 1888, speaking of the Trenton implements, gives his opinion thus: "When examined collectively the correspondence in form and mode of manufacture between symmetric 'turtlebacks,' 'failures,' 'spawls,' 'chips,' and miscellaneous fragments compels the cautious geologist to question whether *any are demonstrably or even probably natural;* the series is not from the certainly natural to the doubtfully artificial, but from the *certainly artificial* to *the doubtfully natural.*" (The italics are my own.)

Implements similar to those referred to have been found by thousands in the District of Columbia, as well as all over the United States, and I have ventured to call them palæolithic. True, they have been found principally upon the surface or in the alluvium which is its equivalent. They are not presented as furnishing complete proof of the *antiquity* of the palæolithic period, but they have been found *in situ*. They are part of the *res gestæ*, and must be accepted as evidence in the case tending, at least, to establish the *existence* of a palæolithic period in the District of Columbia.

That the implements found in the District of Columbia and the Potomac Valley, illustrated in Plates XVII to XXI were of human manufacture, and that they belong to the palæolithic period, can be demonstrated by comparing them, first, with one another; second, with like implements found in the river gravels in the United States; third, with like implements found in other countries, both in the gravels and on the surface.

The details of this comparison would extend to—

Form and appearance; material; mode of fabrication; use and purpose.

In contrast to the similarity of palæolithic implements will be found an equally marked dissimilarity of implements belonging to the neolithic period, whether of Europe or of America, extending to details of appearance, mode of fabrication, material, and purpose. The wider the geographic range of this comparison and the more minute its details, the more conclusive it becomes. For instance, if, instead of confining our comparison to palæolithic implements from the District of Columbia, we include those from all over the United States; and if, instead of comparing them with like implements from England and France, we extend our comparison to those from Africa and India, we find them all alike, and consequently all are true palæolithic implements.

Palæolithic implements from the District of Columbia, indeed from all over the United States, are always chipped, never polished; are almond-shaped, oval, or sometimes approaching a circle; the cutting edge is at or towards the smaller end, and not, as during the neolithic period, towards the broad end. They are frequently made of pebbles, the original surface being sometimes left unworked in places (see *b* and *c*, Plate XXI), sometimes at the butt for a grip, sometimes on the flat or bottom side, and sometimes, in cases of these pebbles, on both sides. The differences between the natural and artificial portions are readily distinguishable.

These implements are exceedingly thick compared with their width, so much so as to make it apparent that they were never intended to have a shaft or handle after the fashion of either the axe or the arrow or spear head. This statement does not apply solely to the larger implements, weighing several pounds; for there are small ones of varying sizes, perfect in themselves, with an evidently intentional protuberance which renders hafting impracticable.

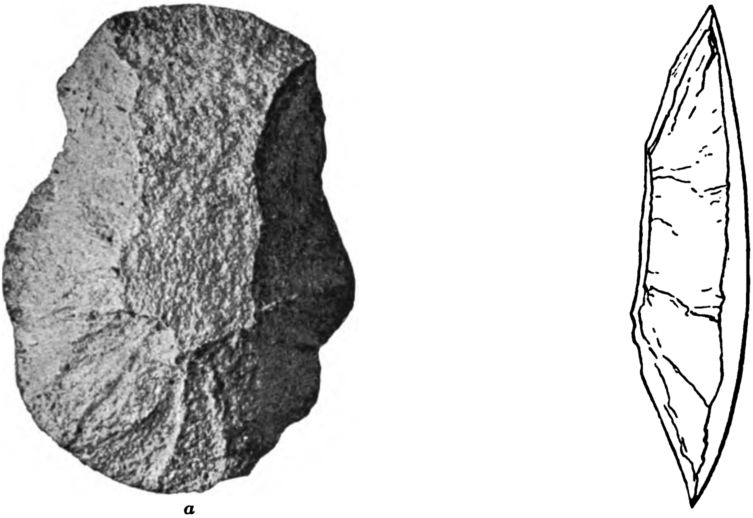
The above-noted features bring into greater prominence the important fact that the implements are all of a common type. They are all alike, and yet not alike. They are not copies, yet there is no mistaking their likeness to each other. When this likeness is found to extend to thousands of implements, coming from every part of the United States, it produces in the mind of the examiner a conviction impossible to escape.

The palæolithic implements found in the District of Columbia compare favorably with those collected by Dr. Abbott at Trenton, and they are equally if not more like the Chelleen implements found in Europe and Asia.

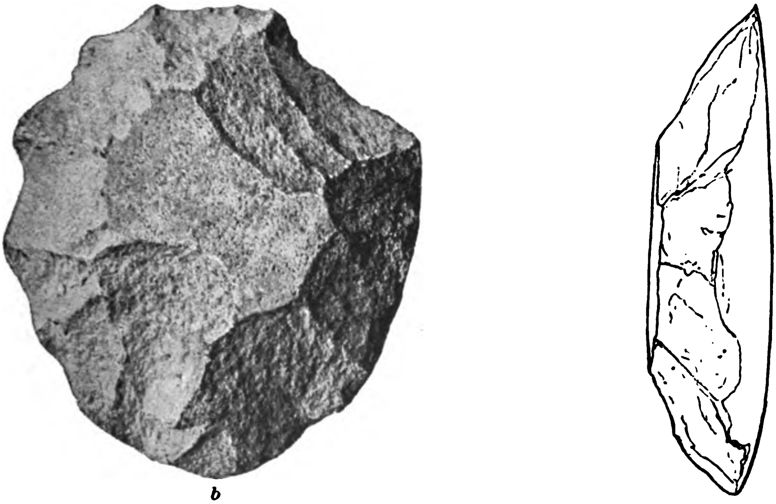
The greater portion of palæolithic implements from Europe are of flint. Flint is scarce in the United States, and we have but few flint implements in any prehistoric epoch. We have, however, some of these flint palæoliths from Texas and more from Utah and New Mexico, and I invite a comparison of them with the Chelleen implements of flint from western Europe.

The palæolithic implements of the United States were mostly made of quartzite. I invite a comparison of specimens of the same material from the Bois-du-Rocher, from Toulouse, from the caverns of Creswell Crags, Derbyshire, England, and those from the laterite near Madras, in India.

The culture of the neolithic period spread over the world, and the implements are well defined and known to all archæologists. The American Indian belonged to this period of culture, and the majority of his implements are similar to those in other parts of the world. Their dissimilarity from the palæolithic implements now under consideration



a



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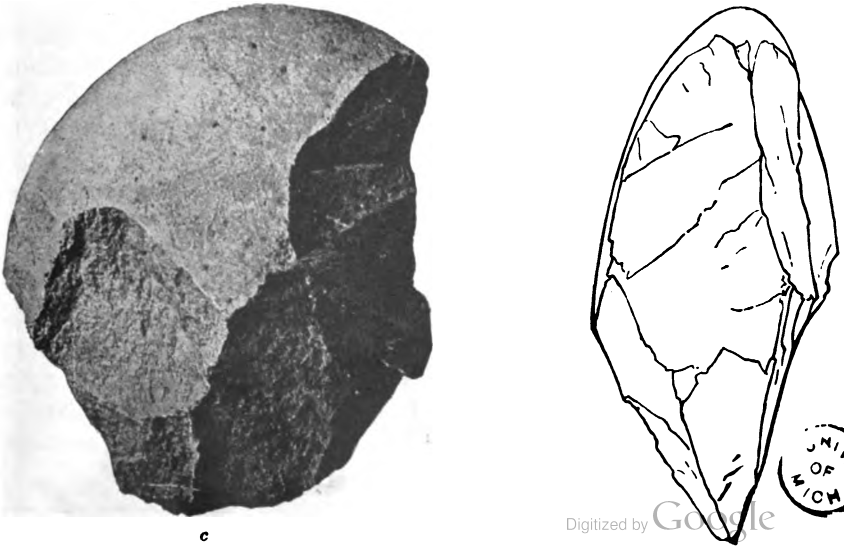

c

PALÆOLITHIC IMPLEMENTS FROM THE DISTRICT OF COLUMBI

UNIV. OF MICH.

is evident on first inspection and becomes more apparent the closer the scrutiny.

They differ in form and thickness; are differently manufactured; are made of different material, and have a different appearance. The cutting end of the implement is reversed, being at the broad end.

The distinct type of implement called palæoliths is not known to have been used by the American Indian. The palæoliths are not Indian axes, nor hatchets, nor scrapers, nor knives, nor spear or arrow heads. Of the thousands of Indian mounds, cemeteries, graves, or monuments of whatever kind which have been explored, not one has ever yielded these palæolithic implements. In circular No. 36 from my office I propounded the question whether palæolithic implements were found in mounds, tombs, or other ancient structures, or associated with other ancient implements. In the hundreds of responses received from every part of the United States there is no affirmative answer. They may have been found associated with other implements on the surface, but in Indian mounds or graves never.

Whether the particular piece chosen by the prehistoric workmen for the manufacture of these implements was a rounded and smoothed pebble or a rough block, his mode of procedure appears to have been the same. He struck off the flakes by blows, probably with a hammer stone. The fracture left a conchoid of percussion, locating the point of blow with certainty. In many of the larger and ruder implements it would appear as if the work was begun and the heavier flakes knocked off by the aid of a punch, probably a stone punch, of which the marks are at times visible, and by means of which the stroke could be confined to a single spot (Fig. 2, Plate xx). In many cases the smaller flakes have been struck from one side and then from the other until the implement was brought to an edge. Not infrequently the edge shows evidences of use, sometimes being battered rough and at other times being worn smooth. None of them are polished, as were the implements of the neolithic period.

Palæolithic man, whether of Europe or of New Jersey, employed for his implements material which possessed certain qualifications. It was necessary that it should be hard, that it might not break or crumble; tough, that it might hold an edge; homogeneous, or at least approximately, so that it might be flaked in any direction; and it was usually of such substance as to break with a conchoidal fracture.

The materials of the implements found in the District of Columbia and throughout the United States possess in a surprising manner the above requirements. They are usually quartz, quartzite, and argillite, and for the most part were pebbles, frequently water-worn.

On the other hand, the North American Indian and his prehistoric ancestors of the neolithic period used all sorts of eruptive rocks for his implements. He made many also out of clay, rocks, slate, shale, and the like, any material serving him which would grind to a smooth surface and make a clean edge, whether capable of being chipped or not. He also used largely the peculiar material chert, which closely approaches the European flint, and, like that rock, may be shaped by a distinctive mode of chipping quite different from that exhibited by the palæoliths.

The line of demarcation can be plainly drawn between the two classes of implements.

It is my opinion that the palæolithic implements of the United States correspond in use and purpose, as they do in their other qualities, with the Chelleen implement of France, which was the representative implement of that period.

These comparisons might be continued indefinitely, and the more thorough the comparison the greater will appear their similarity to other palæolithic implements and their dissimilarity to neolithic implements.

When I compare implements found by the thousand on the hills and in the valleys around the city of Washington with those, also found by the thousand, distributed over the United States from the Atlantic to the Pacific, and find them to be substantially the same implement; when I compare those from America with the equally great number from Europe and the Eastern hemisphere, and find them all substantially the same implement; and when again, comparing them with the implements of the neolithic period, whether European or American, I find them to be unlike except in a few and insignificant details—when I review all these facts I am forced to the conclusion that the implements I exhibit from the District of Columbia are of the same palæolithic type as those found in the gravels at Trenton and elsewhere, and that they tend to prove the existence of a palæolithic period in the United States.

NOTES ON A THIRD COLLECTION OF BIRDS MADE IN KAUAI, HAWAIIAN ISLANDS, BY VALDEMAR KNUDSEN.

BY

LEONHARD STEJNEGER,

Curator of the Department of Reptiles and Batrachians.

A new collection of birds just received from Mr. Valdemar Knudsen in Kauai, Hawaiian Islands, is in many respects as interesting as any of those previously sent, and deserves more than a passing notice.

Puffinus cuneatus SALVIN.

Knudsen's Shearwater. Nau Kane.

1888.—*Puffinus cuneatus* SALVIN, Ibis, 1888 (July 1), p. 353.
1888.—*Puffinus knudseni* STEJNEGER, Proc. U. S. Nat. Mus., XI, 1888 (Nov. 8.), p. 93.

The additional four specimens received from Mr. Knudsen do away with those differences which I imagined to exist between the Hawaiian Islands bird and the description of Salvin's *P. cuneatus* published only a few months before my own, and as the name given by him consequently has the priority, *P. knudseni* becomes a synonym of the former.

Three of these specimens (Nos. 116764–116766) agree closely with the type, except that the sides of throat and neck are distinctly mottled with grayish.

The fourth specimen (No. 116767), although agreeing with the others in dimensions and coloration above, differs considerably in having the whole under surface, including under wing-coverts, of a uniform brownish slate gray (very much like Ridgway's "mouse gray," Nom. Col., pl. II, fig. 11), only slightly paler on middle of chin and throat, and somewhat darker on flanks and under tail-coverts.

Coming, as it does, from the same locality, and agreeing with the others minutely in every other respect, I feel but little hesitation in pronouncing this uniformly colored specimen the dark "phase" of the typical bird with the white under side. In fact the two birds seem to bear the same relations to each other as the dark and the light specimens of *P. sphenurus* figured by Gould. He takes the latter to be the young bird, but there seems to be no good reason for believing that the difference is one attributable to age.

Measurements.

U. S. Nat. Mus. No.	Collector.	Locality.	Wing.	Tail-feathers.	Exp. culmen.	Tarsus.	Middle toe.	Graduation of tail.	Remarks.
116764	Knudsen ...	Kauai, Hawaiian Islands.	290	149	39	46	54	58	....
116765	....do	......do.............	295	145	37	47	55	55	....
116766	....do	......do..................	285	137	40	47	54	50	....
116767	....do	......do..................	294	142	40	46	57	50	....
113445	....do	......do..................	287	138	37	46	54	49	Type of *P. knudseni.*

Bulweria bulweri (JARD. & SELB.).

Bulwer's Petrel.

I have but little doubt that the two birds received from Mr. Knudsen since the rest of this paper was submitted to the printer really belong to this species. They make a very unexpected addition to the Hawaiian fauna.

As far as coloration is concerned they agree minutely with *B. bulweri*, the greater wing-coverts being lighter than the rest of the wing, in this respect differing from the original description,* and, so far as I know, the only one, of *B. macgillivrayi*. Nor are the bills larger; on the contrary, they are somewhat slenderer; nor do the dimensions or proportions differ, as the appended measurements show. The only doubt is caused by the difference in shape of the nasal tube, which in the single specimen of undoubted *B. bulweri* at my command is swollen almost to the base, while in Knudsen's two specimens it is compressed from about the middle backwards. This difference may be entirely unessential, however.

The occurrence at the Hawaiian Islands of this species, which has hitherto been recorded only from the Eastern Atlantic, and as occasionally occurring in Greenland and the Bermudas, is very interesting, especially as we might have expected to find *B. macgillivrayi* there, and raises the question whether the latter, of which I think only one specimen is known, may not simply be an abnormal individual of *B. bulweri*.

Measurements.

U. S. Nat. Mus. No.	Collector.	Sex and age.	Locality.	Wing.	Tail-feathers.	Exp. culmen.	Tarsus.	Middle toe, with claw.	Graduation of tail.
116945	Knudsen....	Ad.	Kauai, Hawaiian Islands	199	110	21	27	30	47
116946	....do	Ad.	.....do	196	113	21	28	28	42
32519	Webb.......	Ad.	Canary Islands	199	109	22	25	28	43

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* "Like *T. Bulweri*, but with the bill rather larger; and it is without the sooty-brown on the wings," GRAY, Cat Birds, Trop. Isl. Pac. Oc., p. 56 (1859). This diagnosis, with slight additions and measurements, is reproduced in Finsch & Hartlaub, Beitr. Fauna, Central Polynes., p. 242 (1867).

Sterna lunata PEALE.

Peale's Tern. **Pakalakala.**

Four specimens of this comparatively rare species, which is here attributed to the Hawaiian Islands for the first time. I have carefully compared them with Peale's type of the species and with a good series of *S. anæthetus* and can vouch for the accuracy of the identification. It is closely allied to the latter species, but is easily distinguished by its much grayer mantle, this being in *S. lunata* of a shade corresponding to Ridgway's "Gray No. 6," while in *S. anæthetus* it is brownish slate. The bill of *S. lunata* also averages considerably longer.

This raises the question as to the *S. anæthetus* reported from the Hawaiian Islands (DOLE'S *S. panaya* ex HARTL. & FINSCH). So far as I can see this record rests solely upon the identification of Bloxham's *S. oahuensis* being the same as *S. anæthetus*. Bloxham's description, however, is that of a young bird, and is clearly referable to *S. fuliginosa* and not to *S. anæthetus*, as indicated by the following sentences: "Head, neck, and breast, black; * * * belly, and under the wings, dusky white;" while in the young *S. anæthetus* the whole under parts are light, this making the chief color distinction of this bird as compared with *S. fuliginosa*, the young of which is colored exactly as described by Bloxham.

Measurements.

U. S. Nat. Mus. No.	Collector and No.	Age.	Locality.	Wing.	Tail-feathers.	Exp. culmen.	Tarsus.	Middle toe, with claw.	Remarks.
116759	Knudsen ..	Ad.	Kauai, Hawaiian Islands...	275	172	45	20	27	....
116760	.. do	Ad.	......do..................	276	180	43	......	......	....
116761	.. do	Ad.	......do..................	272	168	44	......	......	....
116762	....do	Ad.	......do	265	167	41	......	.....	....
15744	Peale, 725...	Ad.	Vincennes Island	255	150	40	......	......	Type .....

Sterna fuliginosa GMEL.

Sooty Tern. **Ewaewa.**

1788.—*Sterna fuliginosa* GMELIN, S. N., I, p. 605.
1826.—*Sterna oahuensis* BLOXHAM, Voy. Blonde, App., p. 251.
1869.—*Sterna panaya* DOLE, Proc. Boston Ac. (*nec Auct.*); *Id.*, Haw. Alm., 1879, p. 56.

These quotations only refer to the Hawaiian fauna, and are not intended for a complete synonymy. They are explained under the foregoing species.

The occurrence of *S. fuliginosa* in the Hawaiian Archipelago does not rest on the identification of Bloxham's *S. oahuensis* alone, for in Mr. Knudsen's collection there is an adult bird of this species, which can not be very rare on the islands, as Mr. Knudsen seems well acquainted with it, for he says that "the Ewaewa is very much like the Pakalakala, but is always black on the back."

Measurements.

U. S. Nat. Mus. No.	Collector.	Age.	Locality.	Wing.	Tail-feathers.	Exp. culmen.	Tarsus.	Middle toe, with claws.
116763	Knudsen ...	Ad.	Kauai, Hawaiian Islands................	280	170	45	23	27

Gallinula galeata sandvicensis (STREETS).

Hawaiian Gallinule. **Alai ula.**

The tarsus of these birds are decidedly red. In every respect they bear out the remarks which I have made on a previous occasion (Proc. U. S. Nat. Mus., 1887, pp. 78–80).

Measurements.

U. S. Nat. Mus. No.	Collector.	Age.	Locality.	Wing.	Tail-feathers.	Culmen, incl. shield.
116778	Knudsen....	Ad.	Kauai, Hawaiian Islands...........................	179	73	50
116779	....do.......	Ad.	......do	165	67	46

Charadrius dominicus fulvus (GMEL.).

Pacific Golden Plover. **Kolea.**

Two in winter plumage and one (No. 116768) with the lower surface black. The yellow of the upper parts is very rich, and with the measurements given below corroborate the correctness of the previous identification of the Plover visiting the Hawaiian Islands.

Measurements.

U. S. Nat. Mus. No.	Collector.	Age.	Locality.	Wing.	Tail-feathers.	Exp. culmen.
116768	Knudsen....	Ad.	Kauai, Hawaiian Islands.............................	164	63	25
116769	....do.......	Ad.	......do	163	64	24
116770	....do.......	Ad.	......do	167	62	26

Arenaria interpres (LINN.).

Turnstone. **Akekeke.**

Two specimens.

Himantopus knudseni STEJN.

Knudsen's Stilt. Aeo.

The black mesial stripe on the rump and the broad black tips to the tail-feathers are well developed in both examples sent. No. 116777 has the entire fore neck mottled with black all across. The dimensions agree well with those of previous specimens, though the wing is rather longer and the tail shorter. The bill, however, is fully up to the standard, but No. 116776 has a remarkably short tarsus. The characters of the new species are thus pretty well established.

Measurements.

U. S. Nat. Mus. No.	Collector.	Sex and age.	Locality.	Wing.	Tail-feathers.	Exp. culmen.	Tarsus.	Middle toe, with claws.
116776	Knudsen ...	♀ ad.	Kauai, Hawaiian Islands	233	77	75	104	43
116777	....do	♀ ad.	......do..................................	232	79	77	112	44

Heteractitis incanus (GMEL.).

Wandering Tattler. Ulili.

Three specimens, two of which (Nos. 116773, 116774) with the whole under surface barred. Bill grooved for two-thirds of its length.

Measurements.

U. S. Nat. Mus. No.	Collector.	Age.	Locality.	Wing.	Tail-feathers.	Exp. culmen.	Nasal groove.	Middle toe, with claw.
116773	Knudsen ...	Ad.	Kauai, Hawaiian Islands................	167	72	41	26	......
116774	....do	Ad.	......do	172	79	41	29	......
116775	....do	....	......do	163	69	39	27	......

Nycticorax nycticorax nævius (GMEL.).

Black-crowned Night Heron. Auku kohili.

Adult and young confirming previous identification.

Measurements.

U. S. Nat. Mus. No.	Collector.	Age.	Locality.	Wing.	Tail-feathers.
116780	Knudsen ...	Ad.	Kauai, Hawaiian Islands....................................	310	115
116781	....do	Jun.	......do..	295	110

Sula piscator (LINN.).

Red-footed Booby. **A.**

One specimen, adding a new species to the Hawaiian list. Bill and feet red.

"The other day, when the men were out fishing, this bird came up to the canoe and tried to take the fish off their hooks." (Knudsen *in litt.*).

Phaëthon rubricauda BODD.

Red-tailed Tropic Bird. **Ula.**

Four specimens of this species, which has already been noted by S. B. Dole as common.

Chasiempis sclateri RIDGW.

Sclater's Spotted-winged Flycatcher. **Amakahi.**

A single specimen, marked as female; differs in no way from the other four previously received. The basal half of the lower mandible is waxy yellow, as in these, and the white on the tail likewise restricted, especially on the other webs, and suffused with tawny.

Measurements.

U. S. Nat. Mus. No.	Collector.	Sex and age.	Locality.	Wing.	Tail-feathers.	Tarsus.
116783	Knudsen ...	♀ ad.	Kauai, Hawaiian Islands............................	67	64	24

Chasiempis dolei STEJN.

Dole's Flycatcher. **Apekepeke.**

Two specimens, male and female, agreeing in all essential points with the original specimens, thus confirming the validity of the species. No. 116784, the supposed male, differs slightly in the tinge of the tawny of the fore neck and chest, it being in this specimen more purplish and less yellowish, while the white wing markings are slightly suffused with the same color round their edges.

The material now before me shows plainly that the entirely black bill and the more extended and pure white on the tail-feathers are additional characters separating *Ch. dolei* from *Ch. sclateri*, inhabiting the same island.

A third specimen (No. 116782), also marked male, has even a stronger wash of tawny on the wing spots than the one mentioned above, and even the back and rump are suffused in the same way, but bill and tail are typical *Ch. dolei.* The differences may be due to age, although the specimen shows no indication of being immature. It should be remarked, however, that this specimen exhibits considerable abrasion of the wing-feathers, while the others are quite fresh. It is therefore probably collected at a different season, which may account for the difference.

Measurements.

U. S. Nat. Mus. No.	Collector.	Sex and age.	Locality.	Wing.	Tail-feathers.	Exp. culmen.	Tarsus.
116784	Knudsen	♂ ad.	Kauai, Hawaiian Islands	69	66	11	24
116785	....do	♀ ad.	......do	70	68	......	25
116782	....do	♂	......do	69	64	11	24

Phæornis myadestina STEJN.

Flycatching Thrush. Ou.

The two specimens of this bird are very interesting, not only because they bear out the characters of the species, thus confirming its validity, but especially because both are young. No. 116786 agrees closely with one of the original specimens, which, at the time, I noted as immature (*l. c.*, p. 71), having the characteristic semilunar spot of buffy white bordered by a blackish fringe at the tip of the wing coverts. The other specimen is still younger. In this the feathers of the rump and the upper tail-coverts belong to the first plumage, having the buffy subapical spot and the black terminal fringe; moreover, all the feathers of the lower surface are margined terminally with grayish or blackish, giving those parts a scaly appearance; tertiaries and inner secondaries are margined apically with whitish. Placing this bird alongside a *Myadestes townsendi* in corresponding plumage, no one would doubt that the characteristic wing pattern, the peculiar structure of the bill, the booted tarsus, and the almost identical appearance of the young plumage are more than superficial similarities. In fact, were it not for the different proportions of wing, tail, and legs, the two birds could hardly be separated generically. It should also be borne in mind that the proportions vary greatly within the genus *Myadestes* itself, and that by selecting our species we can find some in which these proportions differ less from *Phæornis*, than do the most extreme species of *Myadestes* inter se, as will be seen from the following tables:

I. *Ratio between tail and wing.*

Phæornis myadestina	1 : 1.25
Myadestes venezuelensis	1 : 1.15
Myadestes townsendi	1 : 1.15
Myadestes obscurus	1 : 1.02

II. *Ratio between tarsus and wing.*

Phæornis myadestina	1 : 3.12
Myadestes venezuelensis	1 : 4.25
Myadestes townsendi	1 : 5.62
Myadestes obscurus	1 : 4.76

III. *Ratio between tarsus and tail.*

Phæornis myadestina	1 : 2.50
Myadestes venezuelensis	1 : 3.70
Myadestes townsendi	1 : 4.86
Myadestes obscurus	1 : 4.67

In the first table the difference between *Phæornis* and the nearest *Myadestes* is 0.10, that between the extreme species of *Myadestes* 0.13; in the second the same differences are 1.13 and 1.37, respectively; while in the third they are 1.20 and 1.16.

The other parts of the structure agree as well. The bill, with nostrils and bristles, is identical, though somewhat stouter and stronger in *Phæornis;* the wing-formula is the same in *Ph. myadestina* and *M. venezuelensis;* and the tail of these two species is likewise identical in shape. I am also unable to detect any difference in the structure of their feet.

I am now fully satisfied that the two genera are very closely allied, and shall include them both in the group *Myadesteæ* which I established several years ago (Proc. U. S. Nat. Mus., v, 1882, p. 482).

The relationship of *Phæornis* to *Myadestes* is of very great interest, as it is the only instance of a peculiar Hawaiian genus of Passerine birds being related to birds exclusively American in their present distribution.

Measurements.

U. S. Nat. Mus. No.	Collector.	Sex and age.	Locality.	Wing.	Tail-feathers.	Exp. culmen.	Tarsus.	Middle toe, with claw.
116786	Knudsen ...	♂ imm.	Kauai, Hawaiian Islands............	99	78	.....	31	25
116787	....do	♀ jun.	......do	101	79	13	32	26

Hemignathus stejnegeri (WILS.).

Green Sickle-bill. Iwi.

The two *Hemignathus* sent this time differ very decidedly from those previously (Pr. U. S. Nat. Mus., 1887, p. 93) designated by me with doubt as *Hemignathus obscurus* (GMEL.) and afterwards described by Mr. Scott B. Wilson as *H. stejnegeri* (Ann. Mag. Nat. Hist., 6 ser., vol. iv, Nov., 1889, p. 400). In the first place they are larger; wing 88–89$^{\rm mm}$ against 76–82; chord of culmen 57–58$^{\rm mm}$ against 48–53. They are, moreover, much more brightly colored, having the entire upper surface bright yellow-olive (something between Ridgway's "olive green," Nomencl. Col., pl. X, fig. 18, and "wax-yellow," pl. VI, fig. 7), several shades brighter than the rump in those received before; the under surface from chin to breast, as well as the flanks of the same color, only somewhat lighter, shading into "canary yellow" (pl. VI, fig. 12) on the abdomen; lores, black; superciliary stripe, yellow; tibia, white. The birds of the previous collection are olive *gray* on the back, the rump being distinctly yellowish olive, as are also the flanks; sides of head and neck are also grayish like the back, while the whole middle line from chin to anal region is pure yellow. According to Knudsen each collection contained a pair, but the difference seems much less likely to be one of age than of sex. There seems to be no good *a priori* reason against the assumption of the existence of two closely allied species of *Hemignathus* on Kauai, as the differences which I have pointed out above are but little less marked than those which separate *Himatione parva* from my so-called *H. chloris* (*nec* CAB.). For the present, however, I think it better to assume that the specimens have been erroneously sexed, and that the brighter and larger specimens are the males of the present species.

Measurements.

U. S. Nat. Mus. No.	Collector.	Sex and age.	Locality.	Wing.	Tail-feathers.	Cord of exp. culmen.	Distance between tips of mandibles.	Tarsus.	Middle toe, with claw.
116788	Knudsen ...	♂ ad.	Kauai, Hawaiian Islands....	88	51	58	6	27	25
116789	....do	♀ (?) ad.	......do........................	89	53	57	6	26	25

Vestiaria coccinea (MERR.).

Olokele.

Two adults and two young birds of this species, the latter particularly interesting.

No. 116793 has not yet commenced to molt. It is of a dull ocher-yellow, brightest on fore neck and chest, duller and more olive on back, tips of feathers more or less distinctly bordered with black; almost the whole of the innermost tertial and the inner web and tip of the next one light gray, the first mentioned feather somewhat darker in the outer web; bill horny yellow, except culmen which is blackish; legs dark horny brown. No. 116792 is apparently a little older. Red feathers, mostly still in their sheaths, are protruding all over the body; the bill is reddish orange, dusky at base of upper mandible, and the legs have become a light yellowish brown; the tertials are colored as in the foregoing specimen. This point is well worth mentioning, as Sharpe (Cat. B. Brit. Mus., x, p. 7) describes a young female from Hilo, Island of Hawaii, as having the inner webs of the tertiaries white. It is quite possible that the young birds from the various islands show tangible differences which may become obliterated in the old ones as they assume the red plumage.

Oreomyza bairdi STEJN.

Akakane.

One specimen (No. 116795) agrees very closely with the types. It measures as follows: Wing, 69^{mm}; tail-feathers, 44^{mm}; exposed culmen, 12.5^{mm}; tarsus, 20^{mm}; middle toe, with claw, 16^{mm}; hind toe, without claw, 10^{mm}.

Besides this there is another *Oreomyza* which, in spite of its great resemblance to *O. bairdi*, I must regard as a distinct species. I propose to call it

Oreomyza wilsoni sp. nov.

Diagnosis.—Similar to *O. bairdi*, but with the forehead, supercilia, and ear-coverts white suffused with a delicate tinge of pale olive buff; under wing-coverts suffused with sulphur yellow; first primary (from edge of wing) equaling the seventh in length.

Dimensions (type specimen).—Wing, 69^{mm}; tail-feathers, 43^{mm}; exposed culmen, 12.5^{mm}; tarsus, 20^{mm}; middle toe, with claw, 16.5^{mm}; hind toe, without claw, 10^{mm}.

HABITAT.—Kauai, Hawaiian Islands.

Type.—U. S. Nat. Mus., No. 116794. V. Knudsen, collector.

The differences exhibited by this specimen are so many, and of such a character, that they can not be supposed to be due to sex, age, or season. In addition to those pointed out in the diagnosis, the type of this form (with which I wish to associate Mr. Scott B. Wilson's name, in recognition of his ornithological work in the Hawaiian Islands) is browner above, darker olive on the flanks, and less yellow on the chest than the three specimens of *O. bairdi* before me.

?Psittirostra psittacea (TEMM.).

Ou polapalapa.

The two specimens sent, both marked as males, agree closely with those previously recorded from Kauai (Proc. U. S. Nat. Mus., 1887, pp. 389–390), except that in No. 116797 fore neck and chest are distinctly gray, with hardly a tinge of greenish.

Moho braccata CASSIN.

Oo.

One specimen (No. 116800) agrees closely with those previously recorded (Proc. U. S. Nat. Mus., 1887, pp. 100–102). Three others differ somewhat from these in being larger and of deeper, more saturated colors, as well as by absence of light shaft streaks on the interscapulars. The latter may be either the males or the fully adult birds, the former representing females or immature birds. I am inclined to think, however, that the difference is due to sex and not to age.

Measurements.

U. S. Nat. Mus. No.	Collector.	Sex and age.	Locality.	Wing.	Tail-feathers.	Exp. culmen.	Tarsus.	Middle toe, with claw.
116800	Knudsen	......	Kauai, Hawaiian Islands	94	81	......	......	......
116798	do	......	do	98	85	29	......	......
116799	do	......	do	97	86	......	......	......
116801	do	......	do	101	88	28	......	......

DESCRIPTIONS OF NEW ICHNEUMONIDÆ IN THE COLLECTION OF THE U. S. NATIONAL MUSEUM.*

BY

WILLIAM H. ASHMEAD.

This paper represents the results of a continuation of the work mentioned in the introduction to the previous paper by the writer, on the new Braconidæ in the collection of the Museum, published on pages 611–671 of the Proceedings for 1888. It is prepared at Dr. Riley's instance, and is based upon the collections donated by him and upon his recent rearings at the Department of Agriculture, including, as before, a large number of bred species. Where source is not indicated, it is from Dr. Riley's collecting.

Subfamily ICHNEUMONINÆ.

ERISTICUS Wesmael.

This genus is confined to Europe and no species has yet been described in it from North America. The species described in it below agree with the definition of the genus very closely, but may possibly be separated subsequently upon comparison with authentic European types.

All the species but one are smooth, highly polished, and were taken in Wisconsin.

The following table will aid in determining the species:

Thorax, black 2
Thorax dark ferruginous, four terminal abdominal segments, black, ♀. *E. minutus* sp. nov.
2. Abdomen not entirely ferruginous 3
Abdomen entirely ferruginous; scutellum, postscutellum, and a spot on the disk of metathorax, yellow. ♀ .... *E. rufigaster* sp. nov.
3. Scutellum and postscutellum, yellow.
Metathorax, entirely black.
Three basal abdominal segments, red, the following black, ♂. *E. apicalis* sp. nov.
Two basal abdominal segments, red, the following black. ♀. *E. basilaris* sp. nov.
Second abdominal segment, only red. ♀ .... *E. cinctus* sp. nov.
Metathorax with two yellow spots.
Second abdominal segment and apex of third, red. ♂ ... *E. binotatus* sp. nov.

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* This paper has been prepared from material in the Museum, and the types are all in the Museum collection.—C. V. Riley, *Honorary Curator of Insects.*

Eristicus minutus sp. nov.

Female.—Length, 8^{mm}. Head and thorax dark ferruginous, opaque, finely punctulate, two spots on the mesonotum anteriorly and the scutellum and post-scutellum, yellow; antennæ short involuted, the three or four basal joints of flagellum about twice as long as thick, a little narrowed basally, the joints beyond fourth or fifth, transverse; scutellum flattened, truncate behind; metathorax areolated, the posterior face is centrally hollowed, side areas black, the spiracles linear, about two and a half times as long as wide; legs ferruginous, all the femora somewhat swollen, the posterior coxæ with a large yellowish spot above basally; abdomen highly polished, ferruginous, the four terminal segments black, gastrocœli shallow, almost obliterated, ovipositor slightly exserted.

Wings fusco-hyaline; stigma yellowish, areolet pentagonal, the upper side being half the length of the lower outer side, the cubital nervure geniculated at about the middle but without a stump of a vein.

HABITAT.—Wisconsin.

Described from one female specimen.

Eristicus erythrogaster sp. nov.

Female.—Length, 13^{mm}. Head and thorax black, polished; head with a few punctures, a spot on orbits below antennæ and two above at summit of eyes, yellow; clypeus and mandibles, except apex, reddish-yellow; antennæ black, involuted, first joint of flagellum about two and a half times as long as thick, the three or four following joints hardly twice as long as thick, the joints beyond these shorter; tegulæ ferruginous; upper margin of the prothorax interrupted anteriorly, two moderately large spots on mesopleura, spot on disk of mesonotum, scutellum, post-scutellum, a quadrate spot on disk of metathorax, and a spot on metapleura, lemon-yellow; metathorax areolated, truncate posteriorly, the face not hollowed, the spiracles as in previous species; legs ferruginous, all coxæ and first joint of all trochanters, black. Abdomen ferruginous, smooth, highly polished, gastrocœli obsolete, or only indicated by a slight transverse scar in the highly polished surface. Wings hyaline, with a very faint fuscous tinge; stigma and veins piceous, the stigma paler along the inner margin.

HABITAT.—Wisconsin.

Described from one specimen.

Eristicus apicalis sp. nov.

Male.—Length, 13^{mm}. Head, antennæ, thorax, all coxæ and four terminal abdominal segments, black; a spot on scape beneath, face, clypeus and mandibles, except tips, a small dot at summit of eyes and a spot at middle of post-orbits, tegulæ, costæ, scutellum and post-scutellum, yellow; legs and three basal abdominal segments, ferruginous.

The antennæ are porrect, gradually acuminated towards apex; the head and thorax shining, with some scattered punctures; metathorax areolated, spiracles long, linear, contracted at middle; abdomen highly polished, the petiole somewhat conically produced above at the bend just in front of the spiracles, gastrocœli distinct, transverse. Wings subhyaline; stigma and parastigma black, veins brown.

HABITAT.—Wisconsin.

Described from four male specimens.

Eristicus basilaris sp. nov.

Female.—Length, 12^{mm}. Head, thorax, and abdomen, except the two basal segments, black, polished; the head and thorax show a few scattered punctures; there is a small yellow spot at summit of eyes and another one at the middle of the post-orbits; the clypeus and mandibles wholly black; the antennæ are involuted at tips, black, the first joint of flagellum about twice as long as thick, the following gradually become shorter and shorter to the seventh, from thence they are transverse shorter than wide; scutellum and post-scutellum, yellow; metathorax areolated, spiracles linear about five times as long as wide; legs ferruginous, all coxæ and the first joint of anterior and middle trochanters and the posterior trochanters, black; abdomen highly polished, the petiole blackish basally, gastrocœli nearly obsolete, only indicated by a transverse roughness in the polished surface; ovipositor very slightly exserted. Wings subhyaline; stigma and veins brownish-yellow, the costal edge black.

HABITAT.—Wisconsin.

Described from two specimens.

Eristicus cinctus sp. nov.

Female.—Length, 14^{mm}. Black, polished; a line beneath tegulæ and the scutellum lemon-yellow; legs and second abdominal segment flavo-ferruginous; coxæ and first joint of trochanters, tips of posterior femora, extreme tips of tibiæ, and first joint of maxillary palpi, black.

The head and thorax, although polished, show a distinct scattered punctuation; the metathorax is distinctly areolated, the surface of the areas more or less rugulose, the spiracles very long and linear; the gastrocœli are long, slightly oblique, deep. Wings fusco-hyaline; stigma yellowish, veins black.

HABITAT.—Wisconsin.

Described from one specimen.

Eristicus binotatus sp. nov.

Male.—Length, about 16^{mm}, the abdomen being incurved and an exact measurement can not be made. Black; lower orbits connected with two oblique marks on face beneath the antennæ, a spot on scape beneath, pupil on tegulæ and a line beneath, the scutellum, a lateral spot on metathorax, and anterior and middle legs, yellow; posterior legs, second abdominal segment, and the apex of the third, ferruginous; all coxæ and first joint of trochanters black, the apical half of posterior femora and the apex of tibiæ black, their tarsi from apex of first joint fuscous.

The whole insect is polished, but the head and thorax are sparsely punctulate; the gastrocœli large, distinct, with three or four raised lines at bottom, and the apex of petiole is aciculated. Wings fusco-hyaline; veins piceous, stigma paler.

HABITAT.—Wisconsin.

Described from one specimen.

ICHNEUMON Linn.

Ichneumon xanthopsis sp. nov.

Male.—Length, 8^{mm}. Head and thorax black, subopaque, finely punctulate; face, clypeus, mandibles, palpi, orbits narrowly to summit, then interrupted and followed by a dot and a slight dot at middle of post-orbits, yellow; antennæ porrect, black, scape beneath and a spot above, yellow; tegulæ and a short line beneath, scutellum and a dot on metascutellum, yellow; legs yellow; all coxæ, first joint of trochanters, a long streak on anterior and middle femora beneath, posterior femora entirely, apex of their tibiæ and the tarsi, black. Abdomen black, moderately finely punctulate; apex of petiole, the second segment, except gastrocœli, third segment, except narrowly at base and apical two-thirds of fourth segment, yellow; gastrocœli rather large and deep, black, with some raised lines, the space between them reddish and aciculated. Wings, subhyaline; veins brownish; the cubital nervure is broken at about the middle with the stump of a vein; the areolet is pentagonal, the upper side about as long as the lower side.

HABITAT.—St. Louis, Mo.

This species is very close to *I. parvus* Cr., but it is slightly smaller and a little differently colored; the sculpture of the second abdominal segment in *I. parvus* is coarser, more strongly aciculated, the aciculations extending nearly to the middle of the abdomen, and the discal areolet has the upper side only about half the length of the lower outer side.

Ichneumon xanthogrammus sp. nov.

Male.—Length, 8^{mm}. Black and yellow; face, clypeus, mandibles palpi, orbits widened on cheeks, a broad ring on antennæ, superior margin of prothorax, a line on sides and spot beneath, two lines on disk of mesothorax, a short line on the shoulders, tegulæ, and a line beneath, a large spot on mesopleura, spot beneath insertion of hind wings, apical half of metathorax, apex of all the abdominal segments and a large spot above on last segment, all yellow; legs yellow, the posterior pair tinged with ferruginous, the coxæ with a large black spot at sides.

Wings hyaline, very slightly tinged with fuscous; veins piceous, the stigma with a fulvous spot at base.

HABITAT.—Texas.

Described from one specimen in Belfrage collection.

Ichneumon fulvopictus sp. nov.

Male.—Length, 17^{mm}. Black, opaque, confluently punctate; face, clypeus, mandibles, except tips and the palpi, yellow; post-orbits and base of cheeks, ferruginous. Antennæ porrect, gradually acuminate toward apex, ferruginous. Apical half of scutellum, yellow. Metathorax rugose, areolated, spiracles very large, linear, more than four times as long as wide; legs fulvous and ferruginous, anterior and middle coxæ and first joint of trochanters above, black, the middle femora with a black spot behind rear apex; posterior coxæ as well as the first joint of trochanters above entirely black, the femora ferruginous with a black streak beneath and widened and almost encircling the apex above, tibiæ and tarsi fulvous or yellow, the apex of tibiæ dusky. Wings fuliginous, the costæ, parastigma and stigma, fulvous; veins black. Apex of second abdominal segment and sutures of fourth and fifth and the following segments fulvous.

HABITAT.—Missouri.

Described from one specimen in Riley collection.

Ichneumon leucopsis sp. nov.

Male.—Length, 8^{mm}. Head and abdomen black; thorax and legs, ferruginous; the face, clypeus, mandibles, except tips, palpi, orbits, interrupted behind, scape beneath, tegulæ and line in front, a short one beneath and anterior and middle coxæ and trochanters, white; the antennæ are porrect, acuminate towards apex, black. The head and thorax are minutely punctulate; sides of prothorax, sutures of thorax, lines in parapsidal grooves anteriorly, space surrounding insertion of wings and around the scutellum and posterior face of metathorax, black; scutellum red with a whitish posterior margin; metathorax areolated, the spiracles linear. Abdomen long, minutely punctate, opaque, black, the extreme apical edges of the second and the following segments red; gastrocœli rather large, distinct. Apex of posterior femora above, black; tibiæ and tarsi more or less fuscous. Wings hyaline; stigma and veins dark brown; at base of stigma and between it and the parastigma is a small whitish spot; the areolet is pentagonal, the upper side being short, hardly one-third the length of the lower outer side.

HABITAT.—Alameda, Cal.

Described from a single specimen, reared in March, from an unknown Tortricid pupa found on oak.

This species seems to be very distinct from any of our described forms and I know of no species with which it can be compared.

AMBLYTELES Wesmael.

Amblyteles contractus sp. nov.

Female—Length, 7^{mm}. Head and thorax black; palpi, clypeus, spot on face, anterior orbits, antennæ, mesonotum, scutellum, legs and ababdomen, ferruginous; all coxæ black. The head and thorax are moderately punctulate; metathorax minutely rugose, distinctly areolated, the spiracles ovate. Abdomen a little longer than the head and thorax together, the apex of petiole bent, aciculated, the two following segments finely punctulate, the segments beyond almost smooth, and at apex of the third segment is a strong constriction or deep transverse groove. Wings subhyaline; stigma and veins pale yellowish-brown; the cubital nervure has a little stump of a vein at about its middle; areolet pentagonal, the upper side being about the same length as the lower outer side.

HABITAT.—Alaska.

Described from one specimen. The species may be at once recognized by the strong constriction at the apex of the third segment.

Amblyteles Cookii sp. nov.

Female.—Length, 11^{mm}. Ferruginous; antennal joints 8 to 15, yellow; suture of thorax, posterior femora and apex of tibiæ and the five terminal abdominal segments, black, the seventh with a large spot above and the extreme margin of eighth, yellow. Wings subhyaline; the areolet large, pentagonal, the upper side being the same length as the lower outer side, the cubital nervure with a distinct stump of a vein at about the middle. The antennæ are moderately slender, the first joint of flagellum twice the length of the second, the following a little longer than wide. The second abdominal segment is moderately punctulate, the third less distinctly punctulate, the following being smooth and shining; gastrocœli distinct, but neither large nor deep.

HABITAT.—Lansing, Mich.

Described from one specimen received from Prof. A. J. Cook.

PHÆOGENES Wesmael.

Phæogenes gelechiæ sp. nov.

Male and female.—Length, 7 to 8^{mm}. Black, polished, sparsely punctulate; clypeus, mandibles, two basal antennal joints beneath and legs, in male, ferruginous, in the female the disk of clypeus is black, the antennæ ferruginous, except toward apex above, while the collar has a ferruginous blotch in the middle above. Thorax in both sexes exhibits indications of parapsidal grooves anteriorly, the sides of collar and pleuræ with some raised lines and punctures; metathorax distinctly areolated, the surface of the areas being rugose, except the lateral areas anteriorly, these are smooth with a few scattered punctures; the middle discal area is obcordate, the long area of the oblique, posterior face being concave and transversely lined or coarsely transversely aciculated.

Abdomen about one-third longer than the head and thorax together, shaped as in *P. ater* Cr.; in the female highly polished with a few scattered punctures on the second and third segments, the apex of petiole smooth and the segments apically narrowly margined with red; in the male *all* the segments are punctulate and covered with a fuscous pubesence, the base of the second and third segments red, and the apical margin of all the segments, except the petiole, more broadly margined with red than in the female, the two terminal segments being entirely black; in this sex the posterior coxæ and first joint of the trochanters are black, the anterior and middle pairs being dusky. Wings hyaline, pubescent, iridescent; stigma and veins piceo-black.

HABITAT.—New Hampshire.

Described from two specimens, one male, one female, received from Mrs. Mary Treat, reared in August, 1880, from *Gelechia solidaginis* Riley.

Phæogenes missouriensis sp. nov.

Female.—Length, 5^{mm}. Black, polished, the head and thorax with a few small, scattered punctures; clypeus, mandibles, palpi, antennæ (dusky toward apex), and legs, ferruginous. The antennæ are short, stout, involuted at tips. Collar at sides and pleuræ with raised lines; metathorax distinctly areolated, the areas rugose, posterior face concave, transversely lined. Abdomen longer than head and thorax together, smooth, polished, except the apex of petiole, which shows some short, grooved lines, and the second segment, which has some minute, scattered punctures; the base, apex and sides of second segment, the posterior lateral corners, and apical margin of third, and the extreme apical edges of the following segments, ferruginous; tip of ovipositor exposed. Wings hyaline; stigma and veins brown; areolet pentagonal, the upper side the shortest, the others about equal.

HABITAT.—Missouri.

Described from a single female in Riley collection.

Phæogenes hemiteloides sp. nov.

Female.—Length, 3.2^{mm}. Black, polished, the head and thorax with a few scattered punctures. Antennæ ferruginous, gradually becoming dusky toward apex, the flagellum beneath much paler; clypeus, mandibles, palpi and legs, pale ferruginous, the posterior coxæ being dusky basally. Collar, metathorax and sculpture, as in *P. missouriensis.* Abdomen polished, black, apical margins of second and third segments narrowly, and the extreme apical edges of the following segments, reddish-yellow, the petiole microscopically shagreened, the second segment with a few minute punctures, scattered over the polished surface. Wings hyaline; stigma and veins pale brown, areolet complete, the submedian cell a little longer than the median.

HABITAT.—Washington, D. C.

Described from one specimen reared March 12, 1884, from a sawfly on black birch.

This pretty little species, as well as the previous described species, looks much like an *Hemiteles*, but the complete areolet, absence of parapsidal grooves, the subexserted ovipositor and rounded metathoracic spiracles show that both belong to the *Ichneumones Pneustici*, but the mandibles could not be critically examined and they may belong to one of the other genera in this group.

Phæogenes ruficornis sp. nov.

Female.—Length, 3.6^{mm}. Black, subopaque, moderately closely punctulate; antennæ moderately stout, involuted, brown, the scape a little paler beneath; clypeus, mandibles and legs ferruginous; palpi and tegulæ yellow; abdomen rather closely punctulate, the apical margins of all the segments after the petiole, narrowly ferruginous. the petiole with distinct punctures, the venter ferruginous; ovipositor slightly exserted. Wings hyaline, very faintly tinged; stigma and veins pale brown, the costæ to parastigma, yellow.

HABITAT.—St. Louis, Mo..

Described from one specimen in Riley collection.

Phæogenes montivagus sp. nov.

Male.—Length, 6^{mm}. Black, polished, sparsely covered with a whitish pile; face minutely punctulate, with a somewhat prominent V-shaped ridge, the sides of which extend to the base of each antenna; middle of mandibles, palpi, spot on scape beneath, legs, second abdominal segment, except extreme basal lateral angles and four spots on disk, third segment wholly, most of the disk of fourth, and a spot at base of fifth, ferruginous; basal lateral angles and four spots on second segment, all coxæ and first joint of trochanters, middle tarsi, spot at base and the apex of posterior tibiæ and tarsi, black; metathorax areolated, the middle discal area hexagonal, spiracles round; the petiole and basal two-thirds of second abdominal segment, longitudinally aciculated. Wings subhyaline, iridescent; tegulæ yellow; stigma and veins brown-black, the cubital nervure with a stump of a vein before the middle.

HABITAT.—West Cliff, Custer County, Colo.

Described from one specimen received from Mr. T. D. A. Cockerell.

ISCHNUS Grav.

Ischnus americanus sp. nov.

Female.—Length, 8.75^{mm}. Black, smooth, polished; mandibles, except tips, palpi, legs and abdomen, ferruginous; the petiole along the sidesand at base, black. Antennæ 20-jointed black, when extended backwards reach to about the apex of the metathorax, and are covered with black pile, the third joint long, about one-third longer than the following joint, the following joints gradually become shorter and shorter, to the last joint, the six or seven apical joints not being longer than wide, the last being fusiform and about twice as long as the penultimate. Thorax with parapsidal grooves indicated anteriorly, the collar with raised lines on the sides, the scutellum high, convex; metathorax obliquely truncate posteriorly, distinctly areolated, the upper surface very short, the lateral posterior angles rather prominent, spiracles very large and round. Abdomen rather long, pointed fusiform, the venter not retracted but convex, the whole surface, except the petiole, smooth and highly polished, the petiole gradually bent with large round spiracles between the middle and the apex; on the disk is a central, longitudinal groove abbreviated before attaining the apex, and on both sides of the groove are some raised longitudinal lines. Wings hyaline, stigma and veins brown-black, the areolet pentagonal, the upper side the shortest.

HABITAT.—Kansas.

Described from one specimen. The large round metathoracic spiracles and the high convex scutellum will enable this species to be at once recognized.

NEMATOMICRUS Wesmael.

Nematomicrus coloradensis sp. nov.

Female.—Length, 6mm. Black, smooth, highly polished; palpi, legs and abdomen, ferruginous. Antennæ short, rather stout with close set joints, three or four basal joints of flagellum submoniliform, the first joint being not much longer than thick; the scape very stout, oval. Head subquadrate; thorax without parapsidal grooves, the disk flattened; scutellum flat; metathorax distinctly areolated, punctate, the spiracles round; legs rather short, stout, the femora especially so, particularly the posterior pair, posterior coxæ and first joint of trochanters, black, the middle and posterior tibiæ armed at apex with two divergent spines, and the apices of all the tibiæ are surrounded by numerous short, stout spines. Abdomen pointed, fusiform, highly polished and sparsely pubescent, the ovipositor very slightly exserted; the petiole is black, broadened posteriorly, and with some longitudinal striæ before the apex. Wings hyaline; stigma and veins brown-black, the areolet pentagonal, all the sides equal.

HABITAT.—Custer County, Colo.

Described from one specimen, received from Mr. T. D. A. Cockerell.

COLPOGNATHUS Wesmael.

Colpognathus euryptychiæ sp. nov.

Female.—Length, 8mm. Dark ferruginous, shining, the apex of abdomen only slightly dusky, similar in stature to *C. helvus* Cr., but slightly more robust. The antennæ are 26-jointed, involuted, dusky towards apex, with the joints 10 to 13 more or less distinctly yellow, the second, third and fourth joints of the flagellum each being longer; scape stout, swollen. Head and thorax finely punctulate; head subquadrate, as broad as the broadest part of the thorax, the face sparsely pubescent; metathorax very slightly longer than high, truncate behind and distinctly areolated, the spiracles small, oval. Abdomen about half again as long as the head and thorax together, microscopically shagreened, the petiole longitudinally aciculated, the ovipositor slightly exserted. Wings subhyaline; stigma and veins brown-black, a pale spot between parastigma and stigma, the areolet large, pentagonal, the sides nearly equal, the outer nervure being delicate and pale.

HABITAT.—Washington, D. C.

Described from two specimens, reared August 18, 1884, from *Euryptychia saligneana* Clem.

The uniformly darker color, stouter form, more prominent ovipositor, sculpture, and antennal characters at once distinguish this species from *C. helvus* Cr.

Colpognathus annulicornis sp. nov.

Female.—Length, 5.5mm. Pale ferruginous, similar to *C. helvus* Cr., but smaller; the antennæ brown with annulus in the middle, the joints nine to thirteen being yellow, joints one, two and three of flagellum being about equal in length, the fourth and fifth being slightly shorter. The punctuation of the thorax and abdomen is rather coarse, nearly confluent, here differing decidedly from both *C. helvus* and *C. euryptychiæ*. Wings hyaline, stigma and veins ferruginous, the stigma paler basally; areolet pentagonal, the upper side the same length as the lower outer side.

HABITAT.—Bayou Sara, La.

Described from one specimen taken by Mr. E. A. Schwarz, in February, 1879.

HERPESTOMUS Wesmael.

Herpestomus plutellæ sp. nov.

Male.—Length, 5.4mm. Black, polished; antennæ dark brown above, fulvo-ferruginous beneath; head and thorax sparsely finely punctulate, the latter anteriorly with a few transverse wrinkles, the pleuræ more distinctly punctate, the metathorax strongly areolated, the surface of areas transversely wrinkled; spiracles small, round; mandibles outwardly black, inwardly ferruginous, the inner tooth shorter than the outer and situated its length below the outer tooth; palpi and legs, ferruginous, all tarsi, apex of middle tibiæ, streak inwardly on posterior femora, the base and apex of tibiæ, dusky, posterior coxæ and first joint of trochanters, black. Abdomen black, shagreened, the gastrocœli large, distinct, and distant from the basal margin; they, as well as the apical margins of the second, third and fourth segments, are red, the basal margin of third narrowly, and a slight tinge on the extreme apical edge of the fifth segment is also red; the petiole is shining black, minutely longitudinally aciculated. Wings hyaline, strongly iridescent; tegulæ yellow; stigma and veins brownish-black.

HABITAT.—Lafayette, Ind.

Described from two specimens, reared by Mr. F. M. Webster, from *Plutella cruciferarum*.

Subfamily CRYPTINÆ.

STILPNUS Grav.

Stilpnus texanus sp. nov.

Female.—Length, 5.6^{mm}. Head, thorax, petiole, a narrow streak at base of second abdominal segment, the fourth and following segments, except an oblique lateral blotch on the fourth and extreme apical edges of this and following segments, black, the second and third segments and the apical edges of the other segments, rufous. Legs, yellowish-red, the posterior tibiæ black at base and apex, tarsi fuscous. The head and thorax are polished, covered with a white glittering pile, which is denser on the face; metathorax rugose, areolated, the spiracles small, round. Mandibles red, palpi yellow. Antennæ 22-jointed, black, scape with a reddish blotch beneath, the first joint of flagellum is the longest, although only slightly longer than the second. Thorax with distinct parapsidal grooves. The abdomen is oval, with a long petiole, the petiole being but slightly wider at the apex than at base, only slightly bent and with two longitudinal keels above and two along the sides, the spiracles being placed at about the middle; the body of abdomen is composed of only five segments, the first three comprising the greater part of it and moderately minutely punctate and pubescent; the ovipositor short, hardly as long as the three terminal segments. Wings, dusky hyaline; tegulæ yellowish; stigma and veins, brown-black; the cubitus is broken much before the middle by a stump of a vein, the areolet pentagonal, the lower outer side being a little shorter than the upper side, while the other sides are about of an equal length.

HABITAT.—Texas.

Described from one specimen in the Belfrage collection.

EXOLYTUS Förster.

Exolytus gelechiæ sp. nov.

Male.—Length, 5^{mm}; black, subopaque, minutely shagreened, the apical margin of the second and lateral and apical margins of the third abdominal segments and the venter, yellowish-red. Antennæ 29-jointed, black, the scape beneath and the third joint at base, red; palpi, white. Legs, reddish-yellow; the coxæ and trochanters, black. Thorax with parapsidal grooves distinct anteriorly; metathorax scabrous, areolated; the spiracles small, round. Abdomen 7-jointed, elongate, the petiole widened at apex and longitudinally aciculated, the small spiracles are somewhat prominent and situated a little beyond the middle; the second segment is about two-thirds the length of the petiole and slightly longer than the third; the third and fourth are nearly of an equal length, broader than long, the three following being shorter and gradually subequal. Wings, dusky hyaline, strongly iridescent; tegulæ and costæ basally, yellow; stigma and veins dark brown, the stigma very large, triangular, and with a yellowish spot at base; the cubitus is broken just before the middle by a stump of a vein; the areolet is pentagonal in position, but the outer nervure is wanting.

HABITAT.—Alameda, California.

Described from one specimen received from Mr. Albert Kœbele, reared during the month of November, 1887, from a larva of a moth, *Gelechia* sp., found feeding on raw potato.

HEMITELES Grav.

Table of new species.

Wings not banded, hyaline or dusky..5
Wings banded; metathorax not spined.
  Antennæ less than 24-jointed..2
  Antennæ 24-jointed.
  Black; apex of fifth and the following abdominal segments, white.
H. Belfragei sp. nov.
2. Antennæ less than 23-jointed..3
Antennæ 23-jointed.
  Brown; apical abdominal segments black..................*H. melitææ* sp. nov.
3. Antennæ less than 22-jointed..4
Antennæ 22-jointed.
  Brownish-yellow..................*H. coleophoræ* sp. nov.
4. Antennæ 18 jointed.
  Brownish-yellow, variegated with black..................*H. variegatus* sp. nov.
5. Wings hyaline..6
Wings fusco-hyaline.
  Yellow-ferruginous; head black..................*H. nigriceps* sp. nov.
  Black; abdominal segments broadly margined with red; antennæ 29-jointed.
H. humeralis Prov.
6. Pale yellow-ferruginous species..9
Species not entirely black..7
Species entirely black.
  Antennæ 24-jointed..................*H. compactus* Cr.
  Antennæ 23-jointed..................*H. gracilariæ* sp. nov.
  Antennæ 21-jointed..................*H. bucculatricis* sp. nov.
7. Abdominal segments not banded with red or white..8
Abdominal segments banded with red or white.
  Antennæ 22-jointed; apical margins of abdominal segments narrowly red.
H. hydrophilus sp. nov.
  Antennæ 23-jointed..................*H. annulatus* sp. nov.
  Antennæ 24-jointed.
    Extreme apical margins of second and third abdominal segments red; coxæ first joint of trochanters and femora, black (male)...*H. columbianus* sp. nov.
  Antennæ 25-jointed (male); abdominal segments two and three, red basally.
H. Rileyi sp. nov.

8. Metathorax spined.

Black; the second and third abdominal segments, except apex, red. *H. bicornutus* sp. nov.

Black; abdomen red, blackish at apex, the last segment with a large white spot above; antennæ 25-jointed, ringed with white...... *H. annulicornis* sp. nov.

Metathorax not spined.

Abdomen with the second and third segments, except lateral margins and a blotch at base of fourth, red, the rest black; antennæ 26-pointed (male). *H. albiscapus* sp. nov.

Abdomen with the second and third segments, including lateral margins reddish-yellow; antennæ 22-jointed........................ *H. mellicornis* sp. nov.

Abdomen red, the petiole black.

Antennæ female 21-jointed, male, 25-jointed.

Petiole and second abdominal segment aciculated........ *H. texanus* sp. nov.

Antennæ (? broken.)

Petiole and abdomen granulated, apex black......... *H. virginiensis* sp. nov.

Petiole aciculated, rest of abdomen smooth polish.... *H. rubricornis* sp. nov.

Antennæ, male, 23-jointed, petiole aciculated, rest of abdomen smooth. *H. Townsendi* sp. nov.

Antennæ 26-jointed, male.

Petiole and basal two-thirds of second segment longitudinally aciculated. *H. syrphicola* sp. nov.

9. Small, slender, head quadrate.................................. *H. pallidus* sp. nov.

Hemiteles Belfragei sp. nov.

Female.—Length, 5 to 6$^{\mathrm{mm}}$; ovipositor, 1$^{\mathrm{mm}}$. Robust, black, shagreened, opaque, pubescent; the abdomen beyond the second segment smooth, polished; the lateral membranous part at apex of petiole, a large spot at apex of fifth segment, and the sixth and seventh segments, white; the petiole has two keels on the disk abbreviated posteriorly; palpi and antennæ ferruginous, the latter 24-jointed; thorax with the parapsidal grooves strongly indicated anteriorly for one-third the length of the mesonotum, then entirely obliterated; metathorax strongly areolated, the surface of the areas being more or less wrinkled or rugulose; the spiracles round; legs ferruginous. Wings hyaline, with two transverse smoky bands, one narrow at about one-third the length of the wing, the other wider, taking in the upper part of the stigma and all of the marginal cell; tegulæ yellow; stigma and veins black, the former with a yellowish spot basally; the cubitus is broken at the middle by a small stump of a vein; hind wings hyaline.

HABITAT.—Texas.

Described from two specimens in Belfrage collection.

Hemiteles melitææ sp. nov.

Female.—Length, 5$^{\mathrm{mm}}$; ovipositor, 1$^{\mathrm{mm}}$. Yellowish-brown, shagreened, opaque; the thorax has three black streaks posteriorly; the metathorax above basally, a median line on the posterior face, streak on petiole, and the terminal abdominal segments are more or less black. Antennæ 23-jointed, filiform, the first three joints of flagellum being long; thorax without parapsidal grooves; metathorax areolated, the spiracles small and round. Wings hyaline, with two transverse smoky bands, the first across the basal nervure, the other taking in the upper two-thirds of the stigma and all of the marginal cell, the marginal cell though has a clear space next the stigma and there are two or three small clear dots in the areolet; stigma and veins black, except a spot at base of stigma, the median and submedian nervures, the first recurrent nervure and the portion of the cubitus in the clear space between the bands, which are yellow; the cubitus is without a stump of a vein at the middle; hind wings hyaline.

HABITAT.—Alameda, California.

Described from three specimens received from Mr. Albert Kœbele, reared in July, 1887, from *Melitœa chalcedon.* This species is allied to *H. utilis* Norton, but its darker color, more robust form, and the number of joints in the antennæ readily separate it.

Hemiteles coleophoræ sp. nov.

Female.—Length, 3^{mm}; ovipositor, 0.6^{mm}. Yellow-ferruginous, opaque, shagreened, the sutures behind the scutellum alone being black. The antennæ are 22-jointed; wings as in *H. melitœæ.*

HABITAT.—Los Angeles, California.

Described from one specimen received from Mr. Albert Koebele, reared during July, 1886, from a case-bearing Tineid, *Coleophora* sp. found on willow.

This might easily be confounded with *H. utilis* Norton, but the paucity of joints in the antennæ and the uniformly colored abdomen will at once distinguish it.

Hemiteles variegatus sp. nov.

Female.—Length, 2.4^{mm}.; ovipositor, 0.4^{mm}. Brownish-yellow, varied with black, minutely shagreened and opaque; the head is large transverse, wider than the thorax, stemmaticum blackish; antennæ 18-jointed; thorax without parapsidal grooves, and with three black blotches posteriorly; metathorax areolated, the disk black; petiole more or less black, a blotch on disk of second and third segments, and the following segments black. Wings hyaline, with two transverse dusky bands.

HABITAT.—Alameda, California.

Described from two specimens received from Mr. Albert Kœbele, reared October 14th, 1885, from a *Bucculatrix* found feeding on *Quercus agrifolia.* The paucity of joints in the antennæ and its minute size will readily distinguish this pretty little species. It looks very much like a winged *Pezomachus.*

Hemiteles nigriceps sp. nov.

Female.—Length, 4^{mm}.; ovipositor, 1^{mm}. Yellowish-red; the head, a spot on the metapleura and the apex of abdomen, black. Wings fusco-hyaline; stigma and veins brown, the stigma with a large yellowish spot at the base. The whole surface of this insect is smooth and polished.

HABITAT.—Martinez, California.

Described from a single specimen, received from Mr. H. W. Turner, December 13, 1882.

The antennæ are broken off and the number of joints can not be determined, but its peculiar color, smooth polished surface, ought to enable the species to be at once recognized.

Hemiteles gracilariæ sp. nov.

Female.—Length, 3.4mm.; ovipositor, 0.6mm. Black, shining, shagreened; the abdomen from apical half of third segment smooth, polished, the petiole longitudinally aciculated. Antennæ 23-jointed, pale ferruginous, above slightly dusky, the first three joints of flagellum of about an equal length; mandibles and legs, including coxæ, reddish-yellow; palpi white; thorax with parapsidal grooves indicated anteriorly. Wings hyaline, iridescent; stigma and veins pale brown.

HABITAT.—Kirkwood, Missouri.

Described from a single specimen received from Miss Mary Murtfeldt, reared August 17, 1886, from *Gracilaria packardella.* This species is closely allied to *H. aletiæ* Riley, but the number of antennal joints and the slight difference in sculpture of abdomen will distinguish it.

Hemiteles bucculatricis sp. nov.

Female.—Length, 2mm.; ovipositor, 0.6mm. Black, shagreened, the thorax opaque, the head and abdomen shining; the abdomen beyond the third segment is smooth polished, the petiole finely aciculated.

Antennæ 21-jointed, ferruginous; thorax with parapsidal grooves indicated anteriorly; tegulæ yellowish-white; legs honey-yellow, hind coxæ, femora, and a spot near base and at apex of tibiæ ferruginous; wings hyaline; stigma and veins pale brown.

HABITAT.—Washington, D. C.

Described from one specimen, reared August 19, 1884, from a *Bucculatrix* found on oak.

Hemiteles hydrophilus sp. nov.

Female.—Length 4mm.; ovipositor 1.2mm. Black, shagreened; the apical edges of abdominal segments red. Antennæ 22-jointed, black, the suture between second and third joints red; thorax with parapsides indicated anteriorly; tegulæ white; metathorax distinctly areolated, the spiracles round. Legs yellowish-red, posterior tibiæ and tarsi fuscous. Wings hyaline, iridescent, stigma and veins brown, the submedian cell a little longer than the median.

HABITAT.—Nova Scotia.

Described from one specimen, labeled "Dipped from the surface of the ocean, 94 miles from Nova Scotia, July 3, 1887." This occurred amongst numerous species so collected by the U. S. Fish Commission schooner *Grampus*, lat. 42° 50′ N., long. 67° 29′ W.; current from the north.

Hemiteles annulatus sp. nov.

Male.—Length 4^{mm}. Black, shagreened; the apical edges of abdominal segments reddish-yellow, the petiole and second and third segments aciculated.

Antennæ 23-jointed, black, scape beneath, suture between second and third joints and mandibles, reddish-yellow; palpi white; thorax with complete parapsidal grooves; tegulæ yellowish-white; metathorax areolated, the surface of areas with raised lines; legs honey-yellow, the posterior pair ferruginous, the posterior coxæ, apex of tibiæ and tarsi, black. Wings hyaline, iridescent; stigma and veins brown, the median and submedian cells of equal length.

HABITAT.—Los Angeles, Cal.

Described from a single specimen received from Mr. A. Kœbele, reared from an unknown Tortricid pupa, in April, 1887.

Hemiteles columbianus sp. nov.

Male.—Length 3.2^{mm}. Black; head and thorax smooth, polished, the parapsides only faintly indicated anteriorly; metathorax minutely rugose, areolated; abdomen shagreened, the extreme apical edges of second and third segments, red. Antennæ 24-jointed; legs dark honey-yellow, all coxæ, first joint of trochanters and femora, except tips, black. Wings hyaline; stigma and veins brown, the median and submedian cells of an equal length.

HABITAT.—Washington, D. C.

Described from one specimen, reared from an unknown case-bearing Tineid, *Coleophora* sp.; no date of rearing is given.

Hemiteles Rileyi sp. nov.

Male.—Length 5^{mm}. Black; basal two-thirds of second, basal one-third of third, and extreme apical edges of second, third, and fourth abdominal segments, red; the abdomen is punctate. Antennæ 25-jointed; the scape beneath, mandibles, palpi, tegulæ, anterior, and middle coxæ and trochanters white; anterior and middle legs, honey-yellow, posterior legs ferruginous, coxæ black, extreme apex of femora, tibiæ and tarsi fuscous. Metathorax rugose, strongly areolated. Wings hyaline, iridescent; stigma and veins brown, the cubitus with a stump of a vein at the middle.

HABITAT.—St. Louis, Missouri.

Hemiteles bicornutus sp. nov.

Male.—Length, 5^{mm}. Black, polished; apex of petiole, second and basal two-thirds of third abdominal segment, red. Antennæ broken; mandibles and palpi ferruginous; thorax with the parapsidal grooves distinct anteriorly for two-thirds the length of mesonotum; metathorax areolated, the posterior lateral angles prominently produced; legs reddish-yellow, all coxæ and first joint of trochanters basally, black; the petiole has two parallel keels its entire length, the spiracles being prominent. Wings hyaline, iridescent; tegulæ yellowish; stigma and veins brown, the median and submedian cells of an equal length, the cubitus slightly geniculated just before the middle with a bulla just behind, but without a stump of a vein.

HABITAT.—St. Louis, Missouri.

Described from one specimen.

Hemiteles annulicornis sp. nov.

Female.—Length, 5^{mm}; ovipositor, 1^{mm}. Head and thorax black, shagreened; legs and abdomen yellow-ferruginous; knees and apex of posterior tibiæ dusky; apex of abdomen and ovipositor black, the sixth abdominal segment having a large white spot above. Mandibles, except teeth, and palpi ferruginous. Antennæ 25-jointed, dark ferruginous, joints 8, 9, and 10, white. Thorax with complete parapsidal grooves; the pleuræ and metathorax finely rugose, the latter with two transverse keels and the posterior lateral angles produced into small but prominent spines, the spiracles round. Wings dusky hyaline, probably due to cyanide bottle; stigma and veins brown, the submedian cell shorter than the median.

HABITAT.—Texas.

Described from a single specimen in Belfrage collection. This may not be an *Hemiteles*, although the areolet is open along the outer side.

Hemiteles albiscapus sp. nov.

Male.—Length, 6^{mm}. Black, polished and covered with a whitish pubescence; the disks of the second and third and the basal portion of the fourth abdominal segments, rufous. Head subquadrate; mandibles and palpi white. Antennæ 26-jointed, filiform, black, the scape yellowish-white. Thorax with only slight indications of parapsidal grooves anteriorly; a curved carina extends from tegulæ to basal side of scutellum; tegulæ white; metathorax areolated, the spiracles round. Legs reddish-yellow, the anterior and middle coxæ and trochanters white, apex of posterior tibiæ and their tarsi above, dusky. Wings hyaline; stigma and veins brown.

HABITAT.—Texas.

Described from one specimen in Belfrage collection.

Hemiteles mellicornis sp. nov.

Female.—Length, 3.4mm; ovipositor, 1mm. Black, shagreened; abdomen polished, black, the petiole longitudinally aciculated, second and third segments piceous, the third paler at base, the lateral margins honey-yellow. Antennæ, 22-jointed, dark honey-yellow; mandibles pale; palpi and tegulæ, white; thorax with parapsidal grooves indicated only anteriorly; pleuræ almost smooth, polished; metathorax areolated; wings, hyaline, iridescent; stigma and veins pale brown, the submedian cell a little longer than the median.

HABITAT.—Washington, D. C.

Described from one specimen, captured May 18, 1882.

Hemiteles hemerobii sp. nov.

Male.—Length, 3 mm. Black; minutely confluently punctate; abdomen, black, sparsely punctate; the basal half of second and third segments and the apical edge of third, reddish-yellow. Antennæ, 22-jointed, black above, dull ferruginous beneath; the scape white beneath; thorax with parapsidal grooves only slightly indicated anteriorly; tegulæ, white; pleura, smooth, polished in the center, with coarse punctures along the sutures; metathorax, short, coarsely areolated, the areas rugose; legs, reddish-yellow, trochanters white, apex of posterior femora and their tibiæ for more than the apical half and tarsi, dusky; wings hyaline, iridescent; stigma and veins brown, the former with a yellowish spot at base; the cubitus is broken before the middle by a rather long stump of a vein; the median and submedian cells of an equal length.

HABITAT.—Grand Ledge, Michigan.

Described from a single specimen reared from an *Hemerobius* cocoon in July, 1881.

Hemiteles texanus sp. nov.

Female.—Length, 5mm; ovipositor, 1mm. Head and thorax black, polished; legs and abdomen, except the black petiole, ferruginous. Head subquadrate; antennæ, 21-jointed; thorax without grooves; metathorax distinctly areolated, the spiracles small, round. Wings hyaline, iridescent; veins brown, the cubitus without a stump of a vein at the middle; the submedian cell longer than the median.

HABITAT.—Texas.

Described from one specimen.

Hemiteles virginiensis sp. nov.

Female.—Length, 4mm; ovipositor, 1.6mm. Black, opaque, shagreened; legs and abdomen, except petiole and apex, ferruginous. Antennæ broken at tips, the basal portion honey-yellow, becoming dusky toward tips. Thorax without grooves; pleuræ and metathorax shagreened, the metathorax areolated but the ridges delicate. Wings hyaline, iridescent; stigma and veins brown, the median and submedian cells of an equal length, the cubitus being without a stump of a vein.

HABITAT.—Virginia.

Described from one specimen.

Hemiteles rubricornis sp. nov.

Female.—Length, 3^{mm}; ovipositor, 1^{mm}. Black, smooth, polished; antennæ, legs, and abdomen reddish-yellow, the petiole black, longitudinally aciculated. Thorax without grooves; metathorax distinctly areolated. Wings hyaline; stigma and veins yellowish, the submedian cell slightly longer than the median.

HABITAT.—Virginia.

Described from one specimen.

Hemiteles Townsendi, sp. nov.

Male.—Length 5.4^{mm}. Head and thorax black, polished, pubescent, sparsely punctate; antennæ 23-jointed, brown-black, two basal joints, palpi and mandibles ferruginous. Thorax without grooves; collar with raised lines at sides; mesopleuræ smooth, polished, excepting some raised lines and punctures along the sutures; tegulæ pale yellow; metathorax areolated, the surface of areas with short raised lines and wrinkles. Legs and the abdomen, except the black petiole, ferruginous; the posterior legs are rather long, the tips of tibæ and the tarsi slightly obfuscated. Wings hyaline, iridescent; the stigma and veins brown.

HABITAT.—Michigan.

Described from one specimen received from Mr. Tyler Townsend.

Hemiteles syrphicola, sp. nov.

Male.—Length 4^{mm}. Head and thorax black, opaque, minutely shagreened and with some punctures scattered on the surface. Antennæ 24-jointed, yellow-ferruginous, gradually becoming dusky beyond the middle. Thorax with parapsidal grooves indicated anteriorly, pleuræ aciculated, metathorax strongly areolated, the surface of areas minutely rugose; tegulæ yellowish-white; legs reddish-yellow, posterior femora at apex, tibiæ and tarsi dusky. Abdomen ferruginous, the petiole and basal two-thirds of second segment longitudinally aciculated, the rest of the abdomen smooth, polished. Wings hyaline; stigma and veins brown, the cubitus not broken at the middle by a stump of a vein, and the median and submedian cells of an equal length.

HABITAT.—Washington, D. C.

Described from one specimen; reared August 3, 1884, from a Syrphid puparium, *Mesograpta obliqua* Say, found on wheat, the larva of which preys on *Siphonophora avenæ.*

Hemiteles pallidus, sp. nov.

MALE.—Length 3^{mm}. Slender, pale yellow, ferruginous, smooth, shining; head quadrate; antennæ slender (broken); metathorax longer than high, shagreened, delicately areolated, the upper basal areas almost obliterated. Wings hyaline, iridescent; stigma and veins pale brown, the former with a pale spot at base, the third discoidal cell is longer than usual, the cubitus nearly straight, median and submedian cell of an equal length.

HABITAT.—Texas.

Described from one specimen in Belfrage Collection. This little species at first sight looks much like an *Hecabolus* in the family *Braconidæ*, on account of its quadrate head.

MESOSTENUS Grav.

Mesostenus erythrogaster, sp. nov.

Male.—Length, 10^{mm}. Black; mesopleuræ, metathorax, legs and abdomen ferruginous; face, anterior orbits to summit of eyes, lower part of cheeks, clypeus, mandibles, palpi, spot on scape beneath, joints 11 to 17 of antennæ, line on forepart of collar and a line above extending from tegulæ but interrupted medially, tegulæ, a line beneath, pectus, anterior and middle coxæ and trochanters, and all tarsi except base of first joint of hind tarsi, dirty white. The thorax is moderately coarsely punctate, some of the punctures being confluent, the parapsidal grooves distinct, the middle lobe prominent with a yellowish spot behind the middle; metathorax rugose without prominent lateral projections, with two transverse carinæ, the second one being deeply inwardly sinuated medially, spiracles large long-oval. The posterior tibiæ have a spot at base and the apical half black. Wings dusky hyaline; stigma and veins dark brown, the areolet closed, quadrate, the second recurrent nervure interstitial with the outer nervure of the areolet.

HABITAT.—Wisconsin.

Mesostenus leucopus, sp. nov.

Male.—Length, 10^{mm}. Black, shining, the thorax rather coarsely punctate; antennæ 36-jointed, black; the anterior and posterior orbits, interrupted behind the summit of eye, face, clypeus, mandibles, except teeth, palpi, a line on collar at sides anteriorly and a line above, interrupted medially, a spot on disk of mesonotum, scutellum, tegulæ, a line beneath, a long band across middle of mesopleura, band at base of posterior wings, a line on metapleuræ, a line on each side of the metathoracic truncature, and the posterior tarsi, except basal joint at base and the apical joint, which are black, all white.

Legs ferruginous, anterior and middle tarsi paler, the posterior femora and tibiæ fuscous, the first joint of trochanter black, abdomen long, linear, black, the petiole elongate, slender, reddish, blotched with black above at the bend, all the other segments apically are broadly margined with red. Wings hyaline; stigma and veins brown, the areolet quadrate, the second recurrent nervure entering it a little beyond the middle.

HABITAT.—Normal, Illinois.

Described from a single specimen, reared by Mr. F. M. Webster, June 17, 1886, from a sawfly found on wheat.

Mesostenus leucocoxa, sp. nov.

Male.—Lengh 9^{mm}. Black, opaque, including the abdomen rather coarsely punctate; face, clypeus, anterior orbits, lower part of cheeks, scape beneath, triangular spot at base of mandibles, palpi, anterior margin of collar and the upper hinder margin interrupted medially, a round spot on disk of mesonotum, scutellum, post scutellum, tegulæ and a line beneath, spot on mesopleura, hinder lateral posterior angles of metathorax, including the prominent spines, and anterior and middle coxæ and trochanters and the posterior coxæ and trochanters, black; the posterior coxæ have an oval white spot above; anterior and middle legs reddish-yellow, the terminal joint of middle tarsi black; posterior legs black, the femora rufous basally, the tibæ with a white ring at base and the tarsi white, except apical joint and basal half of the basal joint, which are black, the basal portion, however, with a narrow white ring. Wings hyaline; stigma and veins black, the areolet large, quadrate, the second recurrent nervure entering it between the middle and apex, *the submedian cell shorter than the median.*

HABITAT.—Cadet, Missouri.

Described from one specimen received from Mr. J. G. Barlow.

CRYPTUS Grav.

Table of new species.

Wings hyaline, or fusco-hyaline	2
Wings black, or black with strong violaceous reflections.	
Wings black.	
Metathorax unarmed.	
Head, thorax and legs, black; abdomen rufous	*C. coloradensis*, sp. nov.
Head, thorax, legs and abdomen ferruginous	*C. californicus*, sp. nov.
Head, thorax and abdomen mahogany brown	*C. nigripennis*, sp. nov.
Metathorax armed.	
Head and thorax black; legs and abdomen rufous; antennæ ringed with white	*C. armatus*, sp. nov.
Wings black with strong violaceous reflections.	
Head, thorax and legs black; abdomen rufous	*C. violaceipennis* sp. nov.
2. Wings hyaline	3
Wings fusco-hyaline.	
Head and thorax black; abdomen rufous.	
Superior margin of collar white; legs rufous	*C. alamedensis* sp. nov.
Superior margin of collar black; hind legs black	*C. monticola* sp. nov.
Head, thorax and abdomen black; legs (except black trochanters, hind coxæ, tibiæ and tarsi), red	*C. hirtifrons*, sp. nov.
Head, thorax, abdomen and legs, ferruginous	*C. ferrugineus* sp. nov.

3. Head and thorax not black 4
  Head and thorax black.
    Metathorax unarmed; abdomen and legs rufous, the apex of abdomen sometimes black and white.
      Scutellum, superior margin of collar and line beneath tegulæ, white; antennæ ringed with white, apex of abdomen black and white.. *C. texensis*, sp. nov.
      Scutellum and collar entirely black; antennæ black; legs, except the four terminal joints of hind tarsi which are white, black...... *C. leucopus*, sp. nov.
    Metathorax armed; abdomen rufous, black and white.
      Clypeus, orbits, mandibles, line on collar before and behind, scutellum, spots on pleura, metathorax, and ring on antennæ, white.. *C. nebraskensis*, sp. nov.
4. Wholly pale ferrugineous; antennal joints 8 to 12 white.... *C. brevicauda*, sp. nov.

Cryptus violaceipennis sp. nov.

Male and Female.—Length 13 to 14^{mm}; ovipositor 6^{mm}, stature of *C. robustus* Cr. Entirely black, except the four terminal joints of posterior tarsi and the abdomen, which are rufous, the petiole being black. There is a pale dot on orbits opposite the base of the antennæ, another at summit of eye and a narrow pale post-orbital line. The head and thorax are punctate, the parapsidal grooves complete, deeply defined; the scutellum is profoundly foveated at base with lateral keels anteriorly extending as a ridge in front of the tegulæ; pleuræ and meta thorax rugose, opaque, the latter with a central area, the superior edge of the oblique truncature being keeled. Tarsi strongly spinous, the second, third and fourth joints of anterior pair short and strongly lobed; the base of the claws with two teeth, the hinder tooth being small and difficult to make out. The abdomen shows a delicate alutaceous sculpture, the petiole being smooth. Wings black or violaceous black; stigma and veins black, the cubitus with a stump of a vein a little before the middle, the areolet large, pentagonal.

HABITAT.—Colorado.

Described from four specimens.

Cryptus coloradensis sp. nov.

Female.—Length 7.4^{mm}; ovipositor, 4^{mm}. Head, thorax, and legs black; abdomen rufous, alutaceous. The antennæ are long, slender, and black, the first joint of the flagellum being a little shorter than the second and third joints combined. Head above antennæ concave and roughened with irregular lines; the vertex minutely confluently punctate; palpi piceous; thorax with deep, complete parapsidal grooves, punctate; pleura and metathorax finely rugose, the latter with two transverse keels. Wings black, slightly violaceous at base; stigma and veins black; the areolet pentagonal, the upper side the shortest, the upper outer side and the upper inner side of an equal length, the lower outer side being slightly shorter than the inner side; the cubitus with a stump of a vein at the middle.

HABITAT.—Powder River, Colorado.

Described from one specimen.

Allied to *C. americanus* Cr., but at once distinguished from it and the closely allied forms by the black wings.

Cryptus leucopus sp. nov.

Male.—Length 14^{mm}. Entirely black; the anterior legs beneath and anterior and middle knees rufous; a line on anterior trochanters beneath, and extreme base of all the femora, and the apex of second joint of all trochanters, yellowish; the four terminal joints of posterior tarsi, white. Head, transverse, punctate, the forehead concave, rugulose; the anterior orbits from base of antennæ to base of mandibles, the clypeus, mandibles, except at base and the teeth, the second joint of labial palpi outwardly, and a line on the third joint, yellowish-white. Thorax punctate, with deep, distinct parapsidal grooves; the pleura and metathorax rugose, the latter without any distinct keels. Abdomen, except petiole, dark rufous, alutaceous. Wings hyaline or slightly discolored; stigma and veins black, some of the veins being dark piceous; the areolet is large, pentagonal, the cubitus with a stump of a vein at the middle.

HABITAT.—Colorado.

Described from one specimen.

This species, in stature, resembles *C. robustus* Cr., but the color of the legs and abdomen readily distinguish it.

Cryptus alamedensis sp. nov.

Female.—Length 10^{mm}; ovipositor, 4^{mm}. Stature and general appearance of *C. limatus* Cress. Head, thorax, antennæ, ovipositor, all coxæ, the first joint of all trochanters, and the terminal joint of all tarsi, black; legs and abdomen rufous; the anterior tibiæ are very short and abnormally thickened, constricted at base, the posterior tibiæ behind and the basal joint of tarsi fuscous. Head transverse, punctate, below the ocelli more coarsely confluently punctate; posterior orbits, anterior orbits, interrupted opposite the antennæ, and the clypeus, yellowish; palpi mostly black. Thorax punctate, the parapsidal grooves not sharply defined; the upper margin of collar lined with white but widely interrupted in the middle; tegulæ, except a white spot at base, black; a dot beneath the tegulæ and the post-scutellum, white; pleura and metathorax rugose, covered along the sides with a white, glittering pubescence, the metathorax is rounded off behind and has but one poorly defined transverse keel. Wings hyaline; stigma and veins piceous black; the areolet pentagonal, the cubitus without a stump of a vein, and the submedian cell shorter than the median.

HABITAT.—Alameda, Cal.

Described from one specimen received from Mr. Albert Kœbele, reared during April, 1887, from an unknown lepidopterous cocoon.

Although this species could easily be mistaken for *C. limatus* Cress., the short submedian cell, absence of a stump of a vein on the cubitus and other characters will at once separate it.

Cryptus monticola sp. nov.

Female.—Length 8^{mm}; ovipositor 2^{mm}. Stature of *C. similis* Cress. Head and thorax anteriorly, black, punctate; the head more confluently punctate; the parapsides indicated only anteriorly. The abdomen is piceo-rufous and much darker than any of the closely allied forms. All the coxæ, trochanters, and hind legs are black, the anterior and middle legs being rufous, the femora more or less dusky basally. The pleura and metathorax are rugoso-punctate, pubescent; the metathorax has two transverse keels, the narrow space between the first and the post-scutellum being smooth and polished; the other keel is situated along the superior margin of the truncature, it is nearly obliterated medially but becomes sharply defined and prominent at the lateral angles. Wings fusco-hyaline; stigma and veins black; the areolet is large, pentagonal, the two outer sides being equal while the other three sides are longer and of an equal length; the cubitus has no distinct stump of a vein, but where it usually exists is a thickened dot; the submedian cell is slightly longer than the median, and the third discoidal cell is much narrowed at base.

HABITAT.—Veta Pass, Colorado.

Described from a single specimen. The color of the abdomen and wings and the venation sufficiently distinguish this species. It might be placed in Walsh's genus *Joppidium.*

Cryptus texensis sp. nov.

Male.—Length 10^{mm}. Similar to *C. lophyri* Norton, but larger and more robust. Head and thorax black, closely punctate; orbits interrupted above, joints 8 to 12 of antennæ, upper margin of collar, interrupted medially, line beneath tegulæ and most of the scutellum, white. Legs, except coxæ, trochanters and hind tibiæ and tarsi which are black, rufous, the anterior and middle pairs being paler. Apical margin of scutellum black, striate, rest of the scutellum punctate and covered with a long, very fine pubescence. Metathorax coarsely areolated, the surface of most of the areas rugose, transversely wrinkled or transversely lined, the posterior face being coarsely, transversely lined. Abdomen broadly ovate, rufous, segments four and five, black, margined at apex with white, the following segments very short, white. Wings hyaline; costal vein to stigma black, stigma and the other veins brown, the areolet pentagonal, the cubitus kneed at the middle.

HABITAT.—Texas.

Described from a single specimen in Belfrage collection; the species looks very much like an *Ichneumon.*

Cryptus armatus sp. nov.

Female.—Length 12^{mm}; ovipositor 3^{mm}. Head and thorax black, minutely confluently punctulate; legs and abdomen rufous; antennæ black, tip of joint sixth and joints seven to eleven, white, the three basal joints of flagellum very long and gradually subequal, the fourth hardly half the length of the third, the joints beyond being very short and only a little longer than thick.

Thorax with the parapsidal grooves obliterated posteriorly; the metathorax is armed at the posterior lateral corners with a prominent, compressed, acute yellow spine, the posterior face being coarsely rugose with irregular raised lines and ridges, while at the base on the sides it is densely confluently punctate; there is but one transverse carina which is near the base which curves laterally outwardly and then inwardly including inside the curve the oval spiracles. Wings fuliginous; stigma and veins piceo-black; areolet pentagonal, *but the outer nervure is wanting;* the cubitus is without a stump of a vein.

HABITAT.—Texas.

Described from one specimen in Belfrage collection.

This species may not belong to the genus *Cryptus*, on account of the open areolet, but as I know of no other genus into which it could be placed it may remain here for the present.

Cryptus nigripennis sp. nov.

Female.—Length 17^{mm}; ovipositor 4^{mm}. A large, robust, mahogany brown species. It is confluently punctate; the sixth to eleventh antennal joints are yellow; the parapsidal grooves only slightly indicated anteriorly; metathorax somewhat transversely rugose, with two transverse carinæ; all the tarsi are more or less fulvous. Wings black; areolet large, pentagonal, the cubitus without a stump of a vein.

HABITAT.—New Jersey.

Described from a single specimen.

Cryptus hirtifrons sp. nov.

Male.—Length 5.4^{mm}. Black; head and abdomen smooth, shining, the extreme apical edge of second abdominal segment red; thorax punctate, face and cheeks covered with rather dense white pubescence; palpi yellowish; parapsidal grooves distinct; metathorax longer than high, sloping, areolated and pubescent; anterior and middle coxæ and all femora red, the posterior femora black at apex, rest of the legs black. Wings fusco-hyaline; stigma and veins piceous; areolet pentagonal, the cubitus without a stump of a vein.

HABITAT.—Texas.

Described from one specimen.

Cryptus californicus sp. nov.

Female.—Length 12^{mm}; ovipositor 4^{mm}. Ferruginous; eyes, antennæ and wings, black; scape beneath red. Face rather long with two parallel grooves extending from the base of each antenna to clypeus; the clypeus separated. The thorax is sparsely punctate, shining, the parapsidal grooves distinct; pleura and metathorax rugulose; abdomen alutaceous; legs structurally as in *C. violaceipennis*. The wing areolet is large, pentagonal, the cubitus with a long stump of a vein.

HABITAT.—Placer County, Cal.

Described from a single specimen received from Mr. Albert Kœbele.

Cryptus ferrugineus sp. nov.

Female.—Length 5.4^{mm}; ovipositor 1.6^{mm}. Ferruginous; eyes and teeth of mandibles alone black. Wings dusky hyaline. The antennæ are rather stout and the joints close set, the scape being large oval, the third joint being a little longer than the fourth. The surface of the head and thorax, although smooth and shining, exhibits a few small, scattered punctures; parapsidal grooves indicated only anteriorly; tegulæ yellowish-white; pleura smooth; metathorax rugoso-punctate, areolated; abdomen alutaceous. Areolet pentagonal, the cubitus without a stump of a vein, the stigma and veins dark brown.

HABITAT.—Placer County, Cal.

Described from a single specimen received from Mr. Albert Kœbele.

Cryptus brevicauda sp. nov.

Female.—Length 7.4^{mm}; ovipositor 1.4^{mm}. Yellow ferruginous, smooth, and shining; eyes and antennæ black. Antennæ involuted, subclavate, two basal joints, yellow, joints 8 to 12, white. Thorax slightly stained with brown, without grooves; metathorax areolated, the middle area small, elongated, contracted at base. Abdomen smooth, except the second segment, which is roughened basally. The legs are rather short and stout. Wings hyaline, with a slight yellowish tinge; stigma yellow, veins pale brown; the areolet is pentagonal, closed; the outer nervure, however, is pale.

HABITAT.—St. Louis, (?) Mo.

Described from one specimen in Riley collection.

Cryptus nebraskensis sp. nov.

Female.—Length 7^{mm}; ovipositor, 2.4^{mm}. Black, confluently punctate; spot on scape beneath, tip of joint 8 and joints 9 to 11 and base of joint 12 of antennæ above, orbits, two dots on face, clypeus, mandibles, palpi, two lines on collar, two short lines on disk of mesonotum, the scutellum, tegulæ, and a line beneath, a large spot on mesopleura, spot at base of posterior wings, line on metathorax, including the spine, anterior and middle coxæ and trochanters, and posterior tarsi, except basal portion of the first joint, all white. The mesosternum and sides of metathorax are brown; legs red; there is a black dot on anterior and middle coxæ and trochanters; the abdomen is rufous at base and black beyond the middle of second segment, the apex of the segments all margined with white. Wings hyaline; stigma and veins black; areolet pentagonal.

HABITAT.—West Point, Nebr.

Described from one specimen received from Mr. Lawrence Bruner.

BRACHYCENTRUS Tasch.

Brachycentrus fasciatus sp. nov.

Female.—Length 7mm, ovipositor 4mm. Ferruginous; a large quadrate spot extending from ocelli to base of antennæ, antennæ (except joints 8 to 11), prosternum, anterior coxæ and first joint of trochanters, sutures of thorax and apical tip of abdomen, black. Head and thorax punctate, abdomen, alutaceous. The head is large, quadrate, cheeks full. Antennæ slender, the joints very long, apex of joint 8 and joints 9 to 11, white. Parapsidal grooves distinct, complete, the surface anteriorly transversely striate, metathorax rounded off posteriorly with two transverse keels, the last being indistinctly defined medially, although laterally it is quite distinct. Wings hyaline, iridescent, with a transverse dusky band extending from stigma across the wing; stigma and veins black; the submedian cell is a little shorter than the median.

HABITAT.—Texas.

Described from one specimen in Belfrage collection.

CRYPTURUS Grav.

Crypturus texanus sp. nov.

Male.—Length 10mm. Robust, black; orbits, lower cheeks, face, clypeus, the anterior margin and posterior angles of collar, two lines on mesonotum, disk of scutellum, a spot on the lateral ridge extending from side of the scutellum, another one in front, tegulæ, a spot beneath, a large oblong spot on mesopleura, post-scutellum, blotch at base of hind wings, two dots at base of metathorax, the subprominent posterior lateral angles, and a large spot on metapleura, all yellow.

The surface of head and thorax is somewhat coarsely confluently punctate; the parapsides are not indicated; metathorax reticulate with coarse foveæ. Antennæ black (broken); palpi white; legs, including coxæ, reddish-yellow; the posterior legs are abnormally lengthened, the tibiæ at apical two-thirds and the tarsi, black.

Abdomen oblong oval; all the segments broadly margined at apex with yellow; the petiole rather long, slender, a little widened at apex, yellow with a black subapical blotch. Wings hyaline; stigma and veins piceous, the areolet quadrate, the outer nervure wanting.

HABITAT.—Texas.

Described from one specimen in Belfrage collection.

This curious insect, the first of the genus to be detected in the United States, has the general appearance of an *Arotes* and might readily be confused with that genus but for the venation.

Crypturus albomaculatus sp. nov.

Male.—Length 9^{mm}. This species bears a superficial resemblance to that just described, but it is slightly smaller and the markings, although arranged similarly, are white, the legs being decidedly different. The anterior and middle coxæ and trochanters are white, immaculate; the posterior coxæ being white with a large black spot on the inner and outer side near base and another above the openings for the trochanters; the anterior and middle legs are yellowish, the posterior femora rufous with a black spot at apex, apical half of tibiæ black, tarsi, except terminal joint, white. Wings slightly dusky; venation as in previous species.

HABITAT.—Michigan.

Described from two specimens received from Mr. Tyler Townsend. This genus is parasitic on *Polistes.* Kirchner in his Catalogus Hymenopterorum Europæ records having reared the European species *Crypturus argiolus* from the pupæ of *Polistes gallica* Linn. The only Cryptid reared in this country from *Polistes* is *Mesostenus arvalis* Cr. and and both of these genera are closely allied structurally.

NEMATOPODIUS Grav.

Nematopodius texanus sp. nov.

Male.—Length 6^{mm}. Black, opaque, shagreened, sparsely covered with glittering white hairs, especially on the face and along the sides of the body. Antennæ black, filiform, the third joint the longest; mandibles and palpi pale; inner margin of eye slightly sinuate. Thorax not grooved; metathorax a little longer than high and not areolated; there are two delicate abbreviated keels at base just back of postscutellum and a faint one just over the spiracles, the latter evidently the remnants of the first transverse keel. Legs rather slender, brown, the posterior pair dark, the anterior pair more yellowish; the anterior and middle coxæ (except anterior pair basally and a lateral spot on the middle pair), and second joint of all trochanters, yellow; the apical tibial spurs on middle and posterior legs are unusually long and divergent. Abdomen long, linear, the apical margin of third and fourth segments testaceous; the petiole is only slightly wider at apex than at base, the spiracles being situated between the middle and the apex. Wings hyaline; stigma and veins brown; areolet pentagonal, closed, the submedian cell slightly longer than the median.

HABITAT.—Texas.

Described from one specimen. This insect closely resembles certain males in the Ophionid genus *Limneria* with the exception of the pentagonal areolet, and which is the principal reason for my excluding it from that genus.

It is placed doubtfully in the genus *Nematopodius*, as it does not agree in all the characters of this genus defined in Mr. Cresson's

Synopsis, as Mr. Cresson says the areolet is rectangular. On referring to Gravenhorst, however, I find he says "areolet rectangular, rarely pentagonal," and under these circumstances it can be placed here for the present.

ORTHOPELMA Tasch.

Table of species.

Head and thorax black; abdomen not wholly black 2
Head, thorax, and abdomen black.
Male.—Antennæ 23-jointed; abdomen linear; legs yellow-testaceous.
O. bedelliæ sp. nov.
Male.—Antennæ 17-jointed; abdomen oblong oval; legs reddish-testaceous.
O. erythropa sp. nov.
2. Abdomen not entirely ferruginous 3
Abdomen and legs ferruginous; petiole and hind coxæ only black. Female.
O. minutum sp. nov.
3. All coxæ black 4
All coxæ and legs ferruginous; abdomen testaceous, brownish towards apex, the petiole black; antennæ, female 22-jointed, male 25-jointed.
O. diastrophi sp. nov.
Anterior and middle coxæ more or less red or yellow; hind coxæ and petiole black.
All legs yellow-testaceous; abdomen piceo-black, most of the disk of second segment and a spot at base of third gamboge yellow; antennæ 18-jointed.
O. bimaculatum sp. nov.
Hind legs brown; abdomen brownish-red, gradually becoming black towards apex, sometimes at and surrounding the sutures more or less testaceous.
Antennæ, male, 19 jointed; female, 16-jointed .... *O. rosæcola* sp. nov.
Antennæ, male, 27-jointed; female, 22-jointed .... *O. occidentale* sp. nov.
4. Abdomen piceo-black; hind legs dark-brown or black.
Apex of abdominal segments and base of second flavo-testaceous; antennæ broken.
O. coloradense sp. nov.
Apex of abdominal segments not margined, the base of second and third flavo-testaceous; antennae, male and female, 19-jointed .... *O. californicum* sp nov.

Orthopelma bedelliæ sp. nov.

Male.—Length 2.8^{mm}. Black; antennæ brown, 23-jointed, two basal joints and base of third, yellowish; legs ferruginous, hind coxæ black, apex of posterior femora and the tarsi dark-brown. The head and thorax are minutely sculptured; mandibles, palpi, and tegulæ, white; the parapsidal grooves are indicated anteriorly half the length of the mesonotum; metathorax areolated. Abdomen linear, longer than the head and thorax together, the petiole, second segment, and basal part of third, minutely sculptured, or somewhat aciculated, the other segments smooth; the petiole is not quite three times as long as thick, and of the same thickness throughout. Wings hyaline, iridescent; stigma and veins pale brown, the submedian cell is slightly longer than the median, while the areolet is wanting.

HABITAT.—St. Louis, (?) Missouri.

Described from one specimen, reared March 24, 1874, from a Tineid, *Bedellia somnulentella* Zell, in Riley Collection.

This insect is certainly not a true *Orthopelma*, the abdomen and antennal characters being different, but it is so closely related to it that temporarily it may remain here, or until the female is discovered and its true position ascertained.

Orthopelma erythropa sp. nov.

Male.—Length 3^{mm}. Black; antennæ black, 17-jointed, the four basal joints yellowish, the terminal joint fusiform, more than twice the length of the penultimate; legs, including all coxæ, ferruginous; the apical portion of posterior tibiæ and tarsi dusky. The head and thorax are alutaceous, the humeri smoother; tegulæ yellowish-brown; the parapsidal grooves are not defined, although there are slight depressions in the surface of the mesonotum, where they should be; the maxillary palpi are long, pale brown, metathorax short, areolated. Abdomen oblong-oval, with the petiole as long as the head and thorax together; the petiole is nearly four times as long as thick, the same thickness throughout, minutely sculptured, the spiracles before the middle, the rest of the abdomen smooth, shining. Wings hyaline, iridescent; stigma and veins pale brown, the submedian cell not longer than the median, the first branch of the radius as long as the first branch of the postmarginal, or the outer margin of the marginal cell.

HABITAT.—Virginia.

Described from a single specimen.

Orthopelma minutum sp. nov.

Female.—Length 2.4^{mm}; ovipositor, 0.6^{mm}. Black, the abdomen and legs ferruginous, hind coxæ and petiole black. Antennæ 16-jointed, dark-brown. The head is smooth, polished, sparsely pubescent; thorax polished but sparsely punctate, without grooves; metathorax areolated. Abdomen long-oval, smooth, ferruginous, brownish towards apex, the petiole linear, more than four times longer than thick, the spiracles placed much before the middle. Wings hyaline, iridescent; stigma and veins brown, the first branch of radius less than half the length of the first branch of the postmarginal.

HABITAT.—Jamaica Plains, New York.

Described from one specimen, reared May 21, 1884, from a Rose-gall, *Rhodites* sp., received from Miss Cora Clarke.

Orthopelma bimaculatum sp. nov.

Male.—Length 3^{mm}. Black; antennæ 18-jointed, dark brown, scape black, the terminal joint fusiform, one-third longer than the penultimate. Thorax very minutely sculptured, without grooves; tegulæ yellowish-white; metathorax aciculated. Legs yellow-testaceous, the hind coxæ black. Abdomen piceo-black, most of the disk of the second segment and a large spot at base of the third gamboge yellow, the petiole long, linear, black, aciculated, about eight times as long as thick, the spiracles situated at about the middle. Wings hyaline, iridescent; stigma and veins brown; first branch of the radius not quite as long as first branch of the postmarginal.

HABITAT.—La Fayette, Indiana.

Described from a single specimen, received from Mr. F. M. Webster.

Orthopelma occidentale sp. nov.

Male.—Length 4^{mm}. Black; antennæ 27-jointed, black, the scape and pedicel beneath red; legs ferruginous, the posterior pair darker, all coxæ black. The head and thorax are smooth, polished; parapsidal grooves slightly indicated anteriorly; anterior edge of clypeus, mandibles, and palpi red; metathorax areolated. Abdomen oblong-oval, brownish-red, obfuscated or blackish towards apex; petiole black, slightly more than four times longer than thick and linear, the spiracles placed much before the middle. Wings hyaline, iridescent; stigma and veins brown; the first branch of the radius a little longer than half the length of the first branch of the postmarginal nervure.

HABITAT.—Hams Fork, Green River, Wyoming Territory.

Described from one specimen, reared November 28, 1883, from a Rose-gall, *Rhodites similis* Ashm, received from Mr. L. Bruner.

Orthopelma rosæcola, sp. nov.

Male and female.—Length 3.5 to 4^{mm}; ovipositor, 0.6^{mm}. Black; antennæ, female 16-jointed, male 19-jointed, black, apical edges of the scape and pedicel yellow; legs yellow-ferruginous, the posterior pair dark-brown, the femora sometimes black, all coxæ black. The head and thorax are shining, but distinctly minutely punctured, the parapsidal grooves not at all indicated; clypeus piceous; mandibles black; palpi yellow; metathorax areolated. Abdomen oblong-oval, longer in the male, varying in color from a brownish-red to piceous, the male being the darker, and the apex is always dusky, the sutures and more or less of the basal part of the segments are testaceous; the petiole is linear, black, nearly five times as long as thick, the spiracles placed before the middle. Wings hyaline, iridescent; stigma and veins brown, the first branch of the radius is about half the length of the first branch of the post marginal nervure.

HABITAT.—(?) Colorado.

Described from thirteen individuals, reared April 25th to 28th and June 13, 1882, from the Rose-gall *Rhodites ignota* O. S.

Orthopelma californicum sp. nov.

Male and female.—Length 2.6 to 3^{mm}; ovipositor 1.4^{mm}. Black; antennæ 19 jointed in both sexes, in the male the longer; legs yellow-ferruginous to ferruginous, the posterior pair being dark-brown, the thighs sometimes black, all coxæ black. The head and thorax are smooth, polished, the parapsidal grooves slightly indicated anteriorly; clypeus, mandibles, and palpi yellow-ferruginous; tegulæ whitish. Abdomen piceo-black, the petiole and apex black, the base of the second and third segments yellow testaceous; the petiole is linear, about four times as long as thick, the spiracles placed anteriorly about one-third its length. Wings hyaline, iridescent; stigma and veins brown, the first branch of the radius not half the length of the first branch of the postmarginal vein.

HABITAT.—Alameda, California:

Described from three females, one male specimen, reared in May, 1887, from a Rose gall; received from Mr. Albert Kœbele.

Orthopelma coloradense sp. nov.

Female.—Length 4^{mm}; ovipositor 1.4^{mm}; black, polished; thorax punctate, the parapsidal grooves slightly indicated anteriorly and between them a short median line. Legs ferruginous, the posterior pair dark-brown or black, the femora black; tegulæ and costæ yellow; abdomen black or piceo-black; the base of second segment and apex of all the segments narrowly flavo-testaceous; wings hyaline, iridescent; stigma and veins brown; the first branch of the radius is more than half the length of the first branch of the postmarginal.

HABITAT.—West Cliff, Custer County, Colorado.

Described from one specimen, received from Mr. T. D. A. Cockerell.

Orthopelma diastrophi sp. nov.

Male and Female.—Length 4^{mm}; ovipositor 1.6^{mm}. Head and thorax black, shining, punctate; legs, including all coxæ, and abdomen, ferruginous; base of second segment and all the sutures testaceous, the apex more or less dusky, the petiole black.

Antennæ female 22-jointed, dark-brown, the three basal joints paler; clypeus, mandibles and palpi ferruginous; metathorax minutely rugose, areolated; petiole linear, nearly five times as long as thick, spiracles placed before the middle; wings hyaline, iridescent; stigma and veins brown, first branch of the radius about two-thirds the length of first branch of the postmarginal. The male has very long, 25-jointed antennæ, the two basal joints ferruginous.

HABITAT.—Probably Missouri, and Waterbury, Connecticut.

Described from four specimens in Riley collection, also from several specimens in my collection reared by Mr. H. F. Bassett, from galls, *Diastrophus radicum* Bass., at Waterbury, Conn.

ISCHNOCERUS Gravenhorst.

Ischnocerus montanus sp. nov.

Female.—Length 7^{mm}; ovipositor 1.8^{mm}; black, sparsely covered with a short, white, glittering pubescence; head and thorax opaque, minutely sculptured

Antennæ black (broken); palpi and tips of mandibles yellowish; mesopleura impressed at the middle, the metathorax areolated, the spiracles round; legs yellow-ferruginous, all the coxæ and the first joint of posterior trochanters black, the claws pectinate; abdomen shining, alutaceous; the petiole expanded and curved at apex, the spiracles small, round, placed behind the middle and on about the middle of the expanded part; wings hyaline, iridescent; stigma pale brown, the veins piceous black, the areolet entirely wanting.

Habitat—West Cliff, Custer County, Colorado.

Described from one specimen, received from Mr. T. D. A. Cockerell.

The position assigned this insect is uncertain; it may belong to the *Tryphoninæ* on account of the pectinated claws. My reason for placing it here is, that it has a distinct ovipositor and the spiracles of the abdominal petiole are behind the middle and nearer to each other than to the apex, and, except in the pectinate claws, it agrees with the definition of this genus. The pectinate claws seem to ally it to the Tryphonid genus *Ctenopelma*.

CATALYTUS Förster.

Catalytus pallipes sp. nov.

Male and Female.—Length, 3^{mm}; ovipositor very slightly exserted. Black, polished, sparsely pubescent. The antennæ are filiform, 16-jointed in the female, 14-jointed in the male, brown, the two basal joints pale, especially beneath, the third joint is the longest. Palpi, clypeus, face, and orbits to middle of forehead, testaceous. Thorax with indications of parapsidal grooves anteriorly; pleuræ smooth; metathorax very short, polished, without any keels, excepting a slight one separating the metapleura, the spiracles round.

Legs, including coxæ, pale-yellow testaceous; the posterior tibiæ are thickened and contrast with the slender anterior and middle pairs, the tibial spurs minute, the tarsi not longer than the tibiæ.

Abdomen oval, black, polished, the venter and the extreme apex testaceous, the petiole from the base is gradually broadly dilated to apex, with a depression on each side, the spiracles are small, placed a little behind the middle, but on account of the width of the petiole are wider apart than they are to the apex. Wings hyaline, iridescent, tegulæ yellow; stigma and veins brown; the areolet is pentagonal in position but open along the outer side; the submedian cell is longer than the median, the cubitus being slightly bent in the middle.

Habitat.—Georgetown, D. C.

Described from 6 specimens—1 male, 5 females, of which the following is recorded in the note-book of the Department by Mr. Pergande:

> Found near the Aqueduct Bridge, Georgetown, D. C., on May 19, 1881, two saw-fly larvæ which were infested with parasitic larvæ; they fed on the saw-fly larvæ externally in the same manner as *Eupleotrus* larvæ, but were not clustered in a group like the latter.

They were of a dirty brownish gray color, very much resembling slugs, *i. e.*, the segments were not well separated, the dividing sutures only being visible under a strong lens. They, together with the saw-fly larvæ, were placed in a small vial. On the second day they left the saw-fly larvæ, which had become mere skins, and wandered about in the vial; the third day they spun cocoons on the surface of the soil and attached to the side of the vial. About ten days later imagos emerged; no larvæ were preserved.

CREMNODES Förster.

Cremnodes californicus sp. nov.

Female.—Length 2^{mm}; ovipositor only slightly exserted. Dark ferruginous, densely microscopically punctate, and covered with a short fine sericeous pubescence. Head subquadrate, slightly darker colored than the thorax; the face a little prominent medially and roughened; clypeus separated from the surrounding surface by a groove at the sides; a groove extends from base of eye to the base of mandibles; teeth or tips of mandibles black; palpi short, piceous; antennæ 15-jointed, a little longer than the head and thorax together, slightly subclavate, the three basal joints pale, the flagellum brown. Thorax slender, about thrice as long as wide, the mesonotum separated from the metanotum by a deep transverse groove; no scutellum; metanotum smooth. Viewed from the side the thorax is trilobed, a pair of legs being attached to each lobe. The abdomen is ovate, the petiole the length of posterior coxæ and trochanters united, and but slightly widened at apex; ovipositor one-third the length of petiole, black.

HABITAT.—Los Angeles, California.

Described from one specimen received from Mr. Albert Kœbele.

PEZOLOCHUS Förster.

Pezolochus bucculatricis sp. nov.

Male and Female.—Length 1.6^{mm}; ovipositor the length of petiole. Black to brown-black, densely microscopically punctate; the face, collar above and at sides, disk of mesonotum, blotch on metanotum, legs and a streak at base of the petiole, pale yellow ferruginous, the posterior coxæ and femora, darker; in the male all the legs are darker than in the female, and in one specimen the thorax is wholly dark-brown, without the pale ferruginous spots; the apex of the petiole, in both sexes, is yellow.

The head is subquadrate, the face greatly shortened; palpi long, yellowish; antennæ in female slightly subclavate, 19-jointed, pale-brown, yellowish basally, and reaching to base of the second abdominal segment; in the male, much longer, filiform, 20-jointed, reaching to the middle of the abdomen.

The mesonotum is separated from the metanotum by a deep constriction, each part being about of an equal length, but the hinder part or the metanotum, is more elevated, and with a delicate transverse keel on the superior edge of the oblique posterior face, quite distinct at the middle in the male but subobsolete in the female. Abdomen ovate, black, except the petiole, which is pale basally and margined at apex with yellow; the hypopygium in the male is pale yellow.

HABITAT.—Washington, D. C.

Described from three specimens, reared April 18, 1885, from a *Bucculatrix* found on the trunk of a beech tree.

PEZOMACHUS Gravenhorst.

Pezomachus flavocinctus sp. nov.

Female.—Length 4mm; ovipositor 1mm. Head, thorax, antennæ, abdominal petiole, and legs ferruginous; abdomen piceo-black, the petiole and second segment margined at apex with yellow. The whole insect is densely minutely punctulate; head transverse, narrowed behind; clypeus transverse, separated; mandibles terminating in two black teeth; antennæ more than 23-jointed (tips broken off), nearly as long as the whole insect. Anterior lobe of thorax longer than the posterior lobe; metanotum smooth without any keels; body of abdomen long oval, densely covered with a short sericeous pubescence.

HABITAT.—Texas.

Described from one specimen in Belfrage collection. This species approaches nearest to *P. meabilis* Cress., but it is much larger.

Pezomachus californicus sp. nov.

Female.—Length 2.4mm; ovipositor 0.6mm. Head and abdomen, except the petiole, black; thorax, petiole, legs and antennæ dark-brown. The insect is densely minutely punctured, the head and abdomen shining. The antennæ are short (broken at tips), and evidently slightly subclavate; mandibles, except the black teeth and the palpi, are pale. The two lobes of thorax are about equal, the metanotum showing slight traces of a keel at the sides of the posterior face. The sutures of the trochanters and the suture between the petiole and the second abdominal segment are pale-yellowish.

HABITAT.—Los Angeles, California.

Described from a single specimen received from Mr. Albert Kœbele.

Pezomachus alaskensis sp. nov.

Female.—Length 2.6mm; ovipositor the length of the petiole. Brown black, the head black, and the extreme apical edges of the abdominal segments piceous Densely minutely punctured, shining; antennæ broken, pale brown, palpi and legs yellow-ferruginous. The hind lobe of the thorax is a little longer than the front lobe, the oblique face having a delicate carina along the superior edge. Abdomen ovate, covered with a fine, short, sericeous pubescence.

HABITAT.—Nushagak River, Alaska.

Described from one specimen collected by McKay.

Subfamily OPHIONINÆ.

THYREODON Brullé.

Thyreodon texanus sp. nov.

Male.—Length 25^{mm}. Brownish-yellow; the face, palpi, antennæ and legs more yellowish. Wings fuliginous; the stigma as in *Ophion*, yellow; the third discoidal cell one-third longer than in *T. morio.* Head impunctured; clypeus separated at the sides by deep foveæ at base, the anterior margin arcuate; mandibles terminate in two black teeth. Thorax moderately densely punctulate; scutellum with lateral keels; metathorax gradually sloping off behind, rugose, the disk posteriorly a little concave and the rugosities more transverse; there is a transverse keel at the base and the spiracles are large, linear, and surrounded by a groove.

HABITAT.—Texas.

Described from one specimen, easily recognized by its peculiar color and the fuliginous wings. It comes nearest to *Thyreodon ornatipennis* Cr. described from Orizaba, Mexico. The large stigma might exclude it from the genus *Thyreodon.*

NOTOTRACHYS Marshall.

(?) Nototrachys annulicornis sp. nov.

Female.—Length 12 to 14^{mm}; ovipositor 2^{mm}. *Male* 17^{mm}. Ferruginous, coarsely rugosely punctate, the face and sides of body covered with a white pubescence; the face, cheeks, and anterior and middle legs yellowish, *the middle tibiæ at apex armed with two spines and an abbreviated or short one;* the second joint of hind tarsi white. The antennæ are porrect, slender, filiform, the length of the insect, the apical two thirds black; in the female joints 24 to 31 are white or yellow; in the male usually only joints 28 to 31 are so marked, although one of the males has joints 25 to 31 yellow. The apex of metathorax is produced into a neck two-thirds the length of the hind coxæ, at the base are two semicircular areolets, the rest of the surface is rugose. The abdomen is thrice the length of the head and thorax together, strongly compressed and very slender in both sexes, the petiole and second segment are slender, linear, the second segment a little longer than the petiole. Wings hyaline; stigma and veins dark-brown, the venation as in *Ophion.*

HABITAT.—Texas.

Described from four specimens, two male, two female, in Belfrage Collection. On account of the two apical spurs on middle tibiæ, this species does not properly belong to the genus *Nototrachys*, and it is placed here only temporarily.

ANOMALON Gravenhorst.

Anomalon xanthopsis sp. nov.

Male.—Length 16^{mm}. Ferruginous; vertex, sides of collar, mesopectus, mesopleuræ, except a broad band across the middle and the piece at base of hind wings, black; face, orbits, interrupted above, three basal joints of antennæ beneath, mandibles, palpi, anterior and middle legs, and posterior tarsi, yellow. Antennæ fulvous, the three basal joints above black; the third joint two and a half times as long as the fourth. Head and thorax punctate; metathorax rugoso-punctate, reticulate, with three or four longitudinal keels in the middle. Abdomen as in *A. apicale* Say. Wings hyaline; stigma and veins brown; the submedian cell is considerably longer than the median, the discoidal cell long, rectangular, not contracted at base.

HABITAT.—Placer County, California.

Described from one specimen.

This species approaches nearest to *A. californicum* Cress.

(?) Anomalon eureka sp. nov.

Female.—Length 14^{mm}. Brown ferruginous; a blotch on vertex of head inclosing the ocelli, prosternum, collar, and apex of the posterior tibiæ black; the upper margin of mesopleuræ dusky. Antennæ are about half the length of the body, the third joint about thrice as long as the fourth, the following joints a little longer than wide. Head and thorax punctate; the cheeks the width of the eye; the scutellum yellow-ferruginous; metathorax rugoso-reticulate. Tarsi fulvous; the first joint of hind tarsi about the length of the second joint. Abdomen strongly compressed, slender, and of a uniform color, the second segment being longer than the petiole; the spiracles of the petiole are large and situated far from the apex.

Wings fuscous; stigma pale brown, the veins darker; the submedian cell is distinctly longer than the median, the discoidal cell not contracted, rectangular, the upper apical angle of the first discoidal cell obtuse.

HABITAT.—Placer County, California.

Described from one specimen received from Mr. Albert Kœbele.

Anomalon simile sp. nov.

Female.—Length 13^{mm}. Brown ferruginous, exactly similar to *A. eureka* but may be separated from it by the following differences:

The third antennal joint is only about twice as long as the second, the following joints being wider than long; the first joint of hind tarsi a little more than twice as long as the second; the tips of hind femora, as well as the apical tips of the tibiæ, are slightly dusky; the abdomen, when viewed from the side, is broader than in *A. eureka*, the second segment having a black streak above, the apical segments along the sides being more or less fuscous; the spiracles of the petiole are large and oval, and situated close to the apex. Wings fuscous, but the costæ and stigma are yellowish; the submedian cell is but slightly longer than the median, the discoidal cell not contracted, rectangular, the upper apical angle of the first discoidal cell being rectangular.

HABITAT.—Los Angeles, California.

Described from one specimen received from Mr. D. W. Coquillett.

AGRYPON Förster.

Agrypon puparum sp. nov.

Female.—Length 8^{mm}. Black, punctate; face, clypeus, lower portion of cheeks, a dot at summit of eyes, scape, palpi, and hind tarsi yellow; sides of mesonotum, scutellum, and metapleuræ rufous, the parapsidal grooves wanting. Anterior and middle legs yellowish-red; posterior legs rufous, coxæ, first joint of trochanters and the second joint at base above, a streak along the upper edge of femora, and the apical third of the tibiæ black; the basal joint of the tarsi is about thrice as long as the second joint. Metathorax finely rugose, without areolets basally. Abdomen pale ferruginous, the second segment about as long as the petiole, the petiole above at apex and the second and following segments above all black, the black color on the apical segments being extended somewhat along the sides. Wings hyaline; stigma yellowish; the veins piceous; the submedian cell is longer than the median, the upper angle of first discoidal cell obtuse, the third discoidal cell long, rectangular, not contracted at base.

HABITAT.—Alameda, California.

Described from one specimen received from Mr. Albert Koebele, reared from an unknown Noctuid pupa.

Agrypon boreale sp. nov.

Female.—Length 10^{mm}. Black, punctate; face, clypeus, mandibles, lower portion of cheeks, a dot at summit of eye, scape beneath, palpi, tegulæ, dot on apex of posterior angles of collar, anterior and middle legs, and posterior tarsi, yellow; posterior legs rufous, coxæ, first joint of trochanters and second joint above, base of femora, and apex of tibiæ black, the basal joint of tarsi two and a half times as long as the second. Parapsidal grooves present; scutellum quadrate, transversely rugose as well as the surface of the mesonotum just in front of it and not separated from the mesonotum by a groove, the sides delicately keeled. The collar has grooved lines at the sides and the mesopleuræ, and the metathorax are rugoso-reticulate, the latter with two large areolets at the base.

Abdomen pale yellow-ferruginous, the upper surface of the second, third, fourth, and obliquely shading off on the fifth segment, black, the apex black. Wings pale fuscous; veins brown, stigma paler; the submedian cell is a little longer than the median, the upper apical angle of the first discoidal cell obtuse, the first recurrent nervure being very short, the third discoidal cell very long and contracted at base.

HABITAT.—Fort McLeod, British Columbia.

Described from one specimen.

To this Försterian genus also belongs *Anomalon melleum* Cr.

PANISCUS Gravenhorst.

Paniscus texanus sp. nov.

Female.—Length 9^{mm}. This species has probably been confused in our collections with *P. geminatus* Say; but besides its much smaller size it can be readily separated by the following differences:

The third joint of the antennæ is only slightly longer than the fourth; the mesonotum is smooth without parapsidal grooves; the lateral keels of the scutellum become delicate posteriorly; the spiracles of the petiole are placed just anterior to the middle; the second abdominal segment viewed from above is trapezoidal but slightly longer than wide and only half the length of the petiole; the basal joint of hind tarsi only twice the length of the second; the submedian cell is as long or slightly longer than the median cell, the length of the transverse median nevure; while whereas, in *P. geminatus* there is always a distinct stump of a vein at the middle of the cubitus, in *P. texanus* it is entirely wanting or only the base remains.

HABITAT.—Texas.

Described from one specimen in Belfrage Collection.

Paniscus nigripectus sp. nov.

Female.—Length 16^{mm}. This species is much more closely allied to *P. geminatus* than is *P. texanus*, and structurally it is almost identical, but the mesonotum, mesopectus, stigma, and veins are black; the lateral ocelli touch the eye; the stump of the vein at the middle of the cubitus is wanting, and the submedian cell is only one-third the length of the transverse median nervure longer than the median cell; the second abdominal segment is two-thirds the length of the petiole, the spiracles situated at about one-third its length.

HABITAT.—Texas.

Described from one specimen in Belfrage Collection.

CHAROPS Holmgren.

Charops annulipes sp. nov.

Male.—Length 7^{mm}. Head and thorax black, opaque, minutely densely punctate, covered with white pubescence. Antennæ black, the scape pale beneath. Eyes emarginate within. Anterior and middle legs, including coxæ, pale-yellow, tibiæ and tarsi white; hind legs black, the sutures between trochanters and an annulus at base of tibiæ and the spurs white. Metathorax sloping, prolonged at apex beyond the insertion of the hind coxæ. Abdomen long, slender, about twice the length of head and thorax together, the petiole slender, knobbed at apex, as long as the posterior trochanters and femora combined, pale in the middle, black at base and apex, the second segment is not quite as long as the petiole; black above, the third, fourth, and fifth segments ferruginous, dusky above, the following segments black: Wings hyaline, iridescent; stigma and veins piceous.

HABITAT.—Missouri.

Described from one specimen in the Riley Collection.

EXOCHILUM Wesmael.

Exochilum texanum sp. nov.

Male.—Length 19^{mm}. Head and thorax brown, punctate, covered with a fine black pubescence; face, clypeus, and palpi yellowish; antennæ orange-yellow, the first three joints black above; parapsidal grooves distinct, converging and meeting before attaining the scutellum; anterior and middle legs reddish-yellow; posterior legs black, the coxæ brown at base, basal two-thirds of tibiæ and the tarsi yellowish, the basal joint of the tarsi about thrice as long as the second. Abdomen black, the petiole and a small spot at base of the second segment brown.

Wings glossy black; the discoidal cells equal, rectangular.

HABITAT.—Texas.

Described from one specimen.

SCHIZOLOMA Wesmael.

Schizoloma confusa sp. nov.

Female.—Length 27^{mm}. Black; the petiole, most of the second abdominal segment, and the basal half of the third above red; anterior orbits beyond insertion of antennæ, a dot at summit of eyes, posterior orbits, face medially, clypeus, except the anterior margin, the prominent protruding labrum, a line on inner side of mandibles and the palpi yellow.

The head and thorax are punctate, vertex rugoso-punctate, covered with black hairs; parapsidal grooves wanting; scutellum profoundly foveated at base, the posterior portion being very high, cushion-shaped; metathorax coarsely rugoso-reticulate and somewhat hollowed medially.

The anterior and middle legs, excepting coxæ and the posterior tarsi, are orange-yellow, all coxæ, the hind femora toward the apex and tibiæ black; the basal joint of hind tarsi is less than four times as long as the second.

Wings black; tegulæ and a slight streak along basal part of costæ orange-yellow; the submedian cell is longer than the median; the first discoidal cell narrower at base than at apex; the third discoidal cell rectangular, not narrowed at base.

HABITAT.—South Carolina.

This large and beautiful species bears a superficial resemblance to *Exochilum mundum* Say, *Heteropelma flavicorne* Brullé, and *Anomalon flavicorne* Say, but its much larger size, the difference in the color of the legs, length of the basal joint of hind tarsi, prominent exserted labrum, absence of parapsidal grooves, and the venation of the anterior wings will at once distinguish it.

CAMPOPLEX Gravenhorst.

Campoplex texanus sp. nov.

Female.—Length 13^mm^. Black, covered with white pile; abdomen and hind legs rufous; tibiæ and tarsi black; anterior and middle legs honey-yellow, their tibiæ and tarsi white; middle and hind coxæ black. Head and thorax confluently punctate, the head thin antero-posteriorly, the cheeks flat, antennæ black; the gastrocœli deep, oblong, placed a little before the middle of the second abdominal segment. Wings hyaline, the apex dusky; areolet petiolate, triangular.

HABITAT.—Texas.

Described from one specimen in the Belfrage Collection.

CASINARIA Holmgren.

Casinaria texana sp. nov.

Female.—Length 7^mm^. Black, densely punctate, covered with a white, glittering pubescence; antennæ black, ferruginous toward apex, the scape pale at base beneath; mandibles, palpi, tegulæ, and anterior and middle legs, including coxæ, pale yellowish-white; posterior, legs, and abdomen rufous. Eyes emarginate within; metathorax sloping behind and prolonged at apex beyond insertion of posterior coxæ; the disk has a longitudinal depression medially, finely transversely rugose; there is a transverse keel near the base and the sides are areolated, but the middle and apex are not areolated. Ovipositor short, the sheaths black. Wings hyaline, iridescent; the lanceolate stigma and the veins brown; the submedian cell is a little longer than the median; the discoidal cell long, slightly contracted at base; the areolet petiolate, triangular.

HABITAT.—Texas.

Described from one specimen in Belfrage Collection.

LIMNERIA Holmgren.

Table of species.

Species without an areolet 9

Species with an areolet.

Hind legs banded with white and black 5

Hind legs not banded with white.

Head and thorax black; abdomen not entirely black 3

Head, thorax, and abdomen, except venter, black.

Hind coxæ only black 2

All coxæ black, or at least black basally.

Areolet large, sessile; wings subhyaline; size large.

Hind tibiæ black, except at base .... *L. melanocoxa* sp. nov.

Areolet triangular, petiolate; size small or moderate.

Hind femora and tibiæ ringed with black; wings hyaline; size small. *L. nigricincta* sp. nov.

Hind legs rufous; wings dusky hyaline; size moderate.. *L. nolæ* sp. nov.

2. Legs rufous; anterior and middle coxæ and trochanters pale; scape pale beneath. *L. erythropus* sp. nov.

3. Abdomen entirely rufous, except sometimes the petiole basally 4

Abdomen more or less black.

All coxæ rufous or pale.

Cheeks swollen.

Hind legs rufous; anterior and middle pairs pale ferruginous; petiole and second abdominal segment at base, black; rest of abdomen rufous. *L. brachyura* sp. nov.

Cheeks not swollen.

Abdomen black, except a red spot on third segment. *L. ferrugineipes* sp. nov.

Abdomen black, except blotches of red on second and third segments. *L. ruficoxa* Prov. (?)

Abdomen black, except blotch on sides towards apex of second segment and the extreme apical edges of the third and fourth segments. *L. occidentalis* sp. nov.

Abdomen black, except apical third of second segment, apical two-thirds of third, the sides of fourth, connected by a line on disk, and the sides of fifth near the venter, which are red.......... *L. oxylus* Cress.

Hind coxæ only black.

Apex of second segment only red; middle and anterior legs honey-yellow; hind legs rufous.

Base and apex of posterior tibiæ dusky; scape black; ovip. short. *L. hyalina* Prov.

Base of posterior tibiæ ringed with honey-yellow, the apex dusky; scape and second antennal joint pale beneath; ovip. long.... *L. gelechiæ* sp. nov.

Apex of second and the following segments broadly margined with red.

Face covered with a dense silvery pubescence; posterior tibiæ rufous, the tarsi dusky .... *L. argentifrons* Cr.

Face not so covered; posterior tibiæ black, with a reddish streak in the middle along the upper surface .... *L. dubitata* Cr.

Apex of second and third abdominal segments and oblique blotches on sides of fourth and fifth segments rufous; anterior and middle legs white. *L. solenobiæ* sp. nov.

Apex of the second and third abdominal segments and the following wholly rufous. *L. subrubidus* Cr.

Apex of second and most of third, except a blotch at base and the following segments rufous, the ♂ having black blotches at base of all the segments. *L. euuræ* sp. nov.

Middle and hind coxæ black, the middle pair sometimes pale at apex.

Abdomen of ♀ dilated below at fifth segment, the ovipositor springing from its base and directed obliquely forward.

Abdomen, except obscure rufous blotches on sides of the third and fourth segments, black; scape pale beneath.................. *L. obscura* Cr. (?)

Abdomen of ♂ rufous, base of petiole and second and third segments obscurely black, gastrocœli large, deep, placed just before middle of segment. *L. corrupta* Cr.

Abdomen of ♂ rufous, petiole, second segment and a blotch at base of the third, black; gastrocœli almost obliterated; areolet triangular petiolate. *L. obscura* Cr.

Abdomen of ♀ mostly rufous, the base of petiole, second segment, except apex, and a spot at base of third, black; gastrocœli large, shallow; areolet triangular, sessile.................................. *L. sessilis sp. nov.* (?)

Abdomen of ♀ mostly rufous, base of petiole, a long blotch on disk of second segment, and the extreme apical edge and a blotch at base of third segment, black; gastrocœli long; areolet triangular, petiolate. (?) *L. erythrogaster* sp. nov.

Abdomen of ♂ black, a small spot on the second and the sides of the following segments rufous; gastrocœli poorly defined, close to base of segment; areolet, triangular, petiolate.......................... *L. Pattoni* sp. nov.

Abdomen of ♀ dilated below at eighth segment, the ovipositor springing from its base and directed obliquely backwards over the back.

Apex of third and the sides, as well as the sides of the following segments, rufous................ .... *L. eurycreontis* sp. nov.

Abdomen of ♀ dilated below at seventh segment, the ovipositor springing from its base and usually slightly curved upwards.

Apex of the second, third, and fourth segments broadly margined with rufous, the extreme edges of the following segments tinged with red; first joint of all trochanters black; scape black........ *L. consimilis* sp. nov.

Petiole and base of second segment black, rest of abdomen rufous; first joint of hind trochanters only black; scape pale beneath.. *L. peraffinis* sp. nov.

All coxæ ferruginous.

Petiole and second abdominal segment basally black; the following segments more or less dusky above; scape pale beneath; areolet subsessile. *L. oligiæ* sp. nov.

4. Hind coxæ black.

Abdomen wholly ferruginous, size large.................. *L. Belfragei* sp. nov.

All coxæ rufous.

Petiole black basally, ovip. slightly exserted; areolet petiolate; scape pale beneath .... *L. rivalis* Cr.

Petiole concolorous with the abdomen; ovip. not exserted...... *L. lophyri* Riley.

5. All coxæ pale..8

Hind coxæ only black...6

All coxæ black, sometimes anterior and middle pairs pale at apex.

Abdomen entirely black.

Large; metathorax medially sulcate; wings dusky.. .... *L. valida* Cr.

Small; metathorax not medially sulcate; wings hyaline ...... *L. tibiator* Cr.

Abdomen not entirely black.

Extreme apical margins of abdominal segments, except petiole, obscurely tinged with red, lateral blotches on second and third segments, and frequently on the following, red; metathorax not sulcate. *var. L. tibiator* Cr.

Apical one-third of petiole, all of second and basal two thirds of third abdominal segments rufous; metathorax sulcate medially.. *L. dimidiata* Cr.

6. Abdomen not entirely black 7
Abdomen entirely black.
Anterior and middle coxæ and trochanters, white.
Middle area of metathorax narrow; ovip. short .... *L. annulipes* Cr.
Middle area of metathorax wide; ovip. long, half the length of abd. *L. pterophoræ* n. sp.
7. Abdomen more or less rufous.
Anterior and middle coxæ and trochanters, white.
Apex of petiole and second and third abdominal segments and the greater portion of the following rufous; scape pale beneath; ovip. as long as petiole .... *L. fura* Cr.
Apex of all abdominal segments, except petiole, and oblique dilated blotches at sides of the segments after the second, orange yellow; scape black; areolet subsessile .... *L. flavicincta* sp. nov.
Anterior and middle coxæ and trochanters, rufous.
Apex of petiole and second abdominal segment and the greater portion of the following segments, except black blotches at base, rufous; scape rufous beneath .... *L. vicina* Cr.
8. Abdomen entirely black; ovip. hardly exserted.
The small area behind the postscutellum triangular .... *L. fugitiva* Say.
The small area behind the postscutellum quadrate .... *L. ædemasiæ* sp. nov.
9. Abdomen not wholly black 10
Abdomen wholly black; hind coxæ black.
Scape black; hind tibiæ with dusky blotch at base and apex; tarsi dusky but the joints pale at base .... *L. rufipes* Prov.
Scape pale beneath.
Hind femora with a blotch beneath at base; base and tips of tibiæ and the tarsi, except first joint basally, black .... *L. eureka* sp. nov.
Hind femora without a blotch at base beneath; the tip of tibiæ and tarsal joints dusky .... *L. salicicola* sp. nov.
10. Apex of second abdominal segment and blotches on sides of fourth, fifth, and sometimes the following segments, red; scape pale beneath.
Hind coxæ black; posterior legs dark brown; the second joint of trochanters and a blotch on middle of tibiæ, pale; abdomen mostly black; ovipositor long .... *L. cupressi* sp. nov.
Hind coxæ black; posterior legs ferruginous; a dusky blotch at base and apex of tibiæ; anterior and middle coxæ and trochanters white; abdomen with the apex of second and sides of all the segments, red; ovip. long .... *L. obliterata* Cr.
Hind coxæ and legs ferruginous; the tibiæ with a dusky blotch at base and apex; tarsi dusky; anterior and middle legs pale, their coxæ and trochanters white; sides and apices of abdominal segments red. *L. noctuæ* sp. nov.

Limneria melanocoxa sp. nov.

Female.—Length, 9^{mm}; ovipositor, 2^{mm}. Black, punctate; mandibles, except the black teeth, palpi and legs, ferruginous; the posterior tibiæ and tarsi dusky; tibial spurs and base of first tarsal joint, yellowish; all coxæ and first joint of trochanters, black. Metathorax finely rugose with a median sulcus. Wings subhyaline; tegulæ yellowish; costæ and stigma, black; veins brown; the areolet is large, triangular, sessile.

HABITAT.—Texas.

Described from a single specimen in the Belfrage collection.

Limneria nigricincta sp. nov.

Female.—Length, 3.8mm; ovipositor, 1.4mm. Black; head and thorax densely confluently punctate; mandibles and palpi, pale; antennæ black; the antennal tubercles and the suture between the second and third joints, pale; tegulæ white; legs ferruginous; all coxæ and the first joint of hind trochanters, black; the posterior femora with a dusky spot at base and their tibiæ with a black ring at base and apex. Metathorax sloping posteriorly and distinctly areolated. Abdomen black, alutaceous, pubescent; the ovipositor long, a little more than half the length of the abdomen. Wings hyaline; stigma and veins pale brown; the areolet triangular, petiolated.

The male differs from the female only in having the scape pale beneath.

HABITAT.—Washington, D. C., and North Carolina.

Described from six specimens, one labeled North Carolina, two reared from a small Tineid on black birch, April 14, 1884, and the others reared March 15, 1884, from saw-fly larvæ on black birch.

Limneria nolæ, sp. nov.

Male and female.—Length, 6 to 6.5mm; ovipositor, 2mm. Agrees with *L. nigricincta*, except it is much larger and the posterior legs are entirely rufous, the scape in the male entirely black.

HABITAT.—Los Angeles, Cal.

Described from two specimens, one male and one female, received from Mr. Albert Koebele, reared during the summer of 1886 from a *Nola* found on willow.

Limneria erythropus sp. nov.

Male.—Length, 8mm. Black; mandibles, except teeth, and scape and second antennal joint beneath, ferruginous; palpi, tegulæ, and anterior and middle coxæ and trochanters, yellowish-white; legs rufous, posterior pair dark red, their coxæ black. Head and thorax opaque, punctulate, the face sparsely covered with silvery pile. Metathorax distinctly areolated, sloping behind and somewhat produced at apex. Abdomen compressed toward apex, black; the first three segments densely, finely, opaquely sculptured; the following smoother and shining with a sparse pubescence. Wings hyaline, iridescent; stigma and veins brown; the outer edge of costæ and stigma black; areolet triangular, petiolated.

HABITAT.—Texas.

Described from one specimen in Belfrage collection.

Limneria brachyura, sp. nov.

Female.—Length, 5mm. Black; head and thorax closely, confluently punctate; mandibles, except teeth and the scape beneath, ferruginous; antennæ brown, blackish at base; palpi and tegulæ, white; cheeks swollen or buccate; legs, including coxæ, rufous, anterior and middle pairs paler or ferruginous, the apices of joints of posterior tarsi, black. Abdomen subcompressed, rufous; the petiole and second segment at base, black; the ovipositor hardly exserted. Wings dusky hyaline; the veins dark brown; costæ, except at base, and stigma black, costæ at base pale; areolet oblique, petiolate.

HABITAT.—Michigan.

Described from one specimen received from Mr. Tyler Townsend.

Limneria ferrugineipes sp. nov.

Male.—Length, 5^{mm}. Black; head and thorax subopaque, very finely, confluently punctate; face and thorax covered with sparse white pubescence; mandibles, palpi, and tegulæ, white; legs yellow-ferruginous; the trochanters and tarsi pale yellowish; the first joint of posterior trochanters, dusky; apex of posterior tibiæ and the apices of the tarsal joints, dusky. Metathorax not longer than high, rounded behind and areolated. Abdomen black; the gastrocœli and a blotch on side of third segment rufous. Wings hyaline; stigma and veins brown, the former with a pale spot at base; areolet rather large, oblique, and petiolate.

HABITAT.—Texas.

Described from one specimen in Belfrage collection.

Limneria occidentalis sp. nov.

Female.—Length, 5^{mm}; ovipositor, 1.5^{mm}. Black; head and thorax densely, finely, confluently punctate; mandibles, palpi, and tegulæ, white; antennæ, black; legs, including coxæ, rufous; posterior tarsi, except base of first joint, dusky. Metathorax areolated, the small area just back of the postscutellum quadrate, the central median area large, hexagonal. Abdomen, except a red blotch on the second segment towards apex and the extreme apical edges of third and fourth segments, black. Wings hyaline; stigma and veins pale brown; areolet large, triangular, petiolated.

HABITAT.—Central Missouri.

Described from one specimen in Riley collection.

Limneria gelechiæ sp. nov.

Female.—Length, 6^{mm}; ovipositor, 2.4^{mm}; male, 5^{mm}. Black, subopaque, punctate, sparsely covered with a white pubescence; scape and second antennal joint beneath, mandibles, palpi, tegulæ, trochanters, and tarsi, yellowish-white; the last joint of all tarsi and pulvilli and claws black; anterior and middle legs, reddish-yellow; posterior legs rufous, their tibiæ with a yellowish annulus at base; anterior and middle coxæ pale; the middle pair blackish basally; posterior coxæ black. Metathorax sloping behind, a little produced at apex, distinctly areolated, the central median area open behind. Abdomen, except the red apical margin of second segment, black. Wings hyaline, iridescent; stigma and veins brown; areolet petiolate. In the male the middle and posterior coxæ are black.

HABITAT.—Kirkwood, Mo.

Described from two specimens, one male, one female, received from Miss Mary Murtfeldt, reared from *Gelechia celtisella*, August 19, 1884.

Limneria solenobiæ sp. nov.

Male.—Length, 4.4mm. Black, subopaque, densely, finely, confluently punctate; antennæ broken off at base; palpi, mandibles, tegulæ, anterior and middle legs, including coxæ, yellowish-white; hind legs, yellow-ferruginous, the coxæ black. Metathorax sloping off behind, areolated, the small area just back of the postscutellum triangular, the central middle area wanting. Abdomen black; the apical margin of the second and the third segments and oblique spots on sides of the fourth and the fifth, red. Wings hyaline, iridescent, almost devoid of pubescence; stigma brown; veins pale yellowish; areolet oblique, petiolated.

HABITAT.—Kirkwood, Mo.

Described from one specimen, received from Miss Mary Murtfeldt reared from *Solenobia walshella*, July 27, 1887.

Limneria euuræ sp. nov.

Male and female.—Length, 4mm. Black, subopaque, closely, finely punctate; scape and second antennal joint beneath, clypeus, mandibles, palpi, tegulæ, and legs, yellow-ferruginous; hind coxæ black; the tips of hind tarsal joints black. Metathorax areolated, the areas not as distinct as usual. Abdomen rufous, the petiole basal, two-thirds of second segment and a blotch at base of third, black; ovipositor moderately long, curving upwards. Wings hyaline; stigma and veins piceous; areolet oblique, petiolate. The male has black blotches at the base of all the abdominal segments.

HABITAT.—Pareah, Utah.

Described from four specimens, reared April 16, 1881, from a saw-fly, *Euura* sp., found on willow.

(?) Limneria sessilis sp. nov.

Female.—Length, 8mm. Black; head and thorax rather coarsely, confluently punctate; two basal joints of antennæ beneath, mandibles, palpi, tegulæ, and anterior and middle legs, yellowish; the anterior and middle coxæ black at base; the posterior pair wholly black; posterior legs rufous; the trochanters, a ring at base of tibiæ, and the tibial spurs yellowish; the tibiæ and tarsi more or less obfuscated. Metathorax sloping behind, produced slightly at apex, covered with white pubescence but not areolated, and with oval spiracles. Abdomen rufous;

the base of the petiole, basal two-thirds of second segment, except the gastrocœli, and a spot at base of third segment, black; ovipositor very short. Wings dusky hyaline; stigma and costæ black; veins brown; the areolet large, triangular, sessile.

HABITAT.—Washington, D. C.

Described from a single specimen captured October 17, 1882. The species seems more closely allied to the genus *Campoplex*, and is placed here doubtfully.

(?) Limneria erythrogaster sp. nov.

Female.—Length, 7mm. This species is an exact counterpart of *L. sessilis*, but may be at once separated by its triangular, petiolated areolet and the paler posterior tibiæ and tarsi.

HABITAT.—Selma, Ala.

Described from one specimen received from Mr. W. H. Patton. It is doubtful whether the difference in the areolet will hold to separate this species from *sessilis*, but until more specimens are taken and the value of this character definitely determined it is probably advisable to consider them distinct.

Limneria Pattoni sp. nov.

Male.—Length, 6mm. Black; head and thorax finely, confluently punctate; the disk of the thorax rugose; scape beneath and mandibles ferruginous; palpi, tegulæ, anterior coxæ and all trochanters, except the first joint of the posterior pair which is black, white; middle and posterior coxæ black; legs rufous, the anterior pair slightly paler, the posterior tibiæ with a black spot at base and apex and their tarsi dusky. Metathorax sloping behind, areolated, the spiracles very small, round. Abdomen black, a small spot at side of the second segment near apex and the sides of the following segments, rufous; the gastrocœli poorly defined and situated close to the base of the second segment. Wings hyaline; stigma and veins brown; the areolet triangular, petiolated.

HABITAT.—Selma, Ala.

Described from one specimen, received from Mr. W. H. Patton.

Limneria eurycreontis sp. nov.

Female.—Length, 6mm. Black, subopaque, finely, confluently punctate; the disk of thorax somewhat rugose; scape beneath, towards apex, and the mandibles, ferruginous; palpi, tegulæ, anterior coxæ and trochanters, yellowish-white; legs, yellowish-red; middle and posterior coxæ, and sometimes the first joint of hind trochanters, black; posterior tibiæ at base and apex, and their tarsi, dusky. Metathorax sloping behind, areolated, the middle central area absent. Abdomen compressed, dilated below at eighth segment, and from which issues the ovipositor that in its natural position is obliquely directed backwards over the back, black; the apex of the third segment and the sides of the following segments, red. Wings hyaline; stigma and veins, brown; areolet, triangular, petiolated.

HABITAT.—Kellogg, Cowley County, Kans.

Described from several specimens, reared from pupa of *Eurycreon rantalis*, found on corn and sent to the Department by Mr. Jacob Nixon.

Limneria consimilis sp. nov.

Female.—Length, 6mm. Black, subopaque, very finely, confluently punctate; antennæ, black; mandibles, palpi, and tegulæ, yellowish-white; legs, rufous or ferruginous; anterior coxæ pale, middle and posterior pairs, black; first joint of all trochanters, black. Metathorax not longer than high, distinctly areolated, the central middle area hexagonal. Abdomen black; the apex of second, third, and fourth segments broadly margined with rufous; the extreme margins of the following segments tinged with red. Wings slightly dusky; stigma and veins, brown; areolet, large, triangular, petiolated.

HABITAT.—Texas.

Described from one specimen in the Belfrage collection.

Limneria peraffinis sp. nov.

Female.—Length, 6mm. Differs from *consimilis* in having the scape beneath and the first joint of anterior and middle trochanters pale, and the abdomen, except the petiole and basal half of second segment, wholly rufous, while the areolet is large, oblique, and petiolated.

HABITAT.—Texas.

Described from one specimen in the Belfrage collection.

Limneria Belfragei sp. nov.

Male.—Length, 9mm. Closely allied to *L. erythrogaster*, but larger and the abdomen proportionally longer. Black, densely, moderately, coarsely punctate, and covered with a white pubescence; the mandibles, except teeth, palpi, tegulæ, and anterior and middle legs, yellowish-white; the middle coxæ black at base; posterior legs and abdomen, rufous; hind coxæ, black. Wings, hyaline; stigma and veins, brown; the costæ outwardly black; areolet large, subtriangular, petiolated.

HABITAT—Texas.

Described from one specimen in the Belfrage collection.

Limneria pterophoræ sp. nov.

Female.—Length, 4mm; ovipositor, 0.8mm. Black, subopaque, minutely, densely, confluently punctate; antennæ black; mandibles, palpi, tegulæ, anterior and middle trochanters and tarsi, yellowish-white, rest of legs yellowish-red; hind coxæ, first joint of trochanters and base and apex of the tibiæ, black; the middle of the tibiæ and spurs, white; tarsi, except basal portion of the first joint, dusky. Metathorax indistinctly areolated, the middle area greatly widened behind. Abdomen black, pubescent; ovipositor about half as long as the abdomen, slightly curved. Wings hyaline, iridescent; stigma and veins brown; the areolet oblique, petiolated.

HABITAT—Alameda, Cal.

Described from one specimen, received from Mr. Albert Kœbele; reared in August from a *Pterophora* on apple.

Limneria flavicincta sp. nov.

Male.—Length, 4$^{\mathrm{mm}}$. Black, opaque, densely, finely punctate; face covered with dense white hairs; antennæ black; mandibles, palpi, tegulæ, anterior and middle coxæ and trochanters, and the second joint of posterior trochanters, yellowish-white; legs reddish-yellow; posterior femora ringed at base with black; posterior tibiæ with a small white annulus at base and a broader one at the middle, and a subbasal annulus and the apex, black; their tarsi black; the extreme base of first joint, and the tibial spurs, white. Abdomen cylindrical, hardly compressed, the apex of all segments, except petiole, and oblique dilated blotches at sides of segments after the second, orange-yellow; venter yellowish-white, with black spots on third, fourth, fifth, and sixth segments. Wings hyaline, strongly iridescent; stigma and veins brown; areolet petiolated.

HABITAT.—Lafayette, Ind.

Described from two specimens received from Mr. F. M. Webster.

Limneria œdemasiæ sp. nov.

Male and female.—Length, 7$^{\mathrm{mm}}$. Stature and general appearance of *L. fugitiva* Say, and in color and markings the same, but at once separated from it by the areas of metathorax and the difference in the areolet of anterior wings. In *fugitiva* the small area just back of postscutellum is triangular, and the areolet is oblique, petiolate, stigma and veins brown; in *oedemasiæ* this area is quadrate, the areolet oblique, sessile, stigma and veins black or piceous-black, and the extreme base of the first joint of hind tarsi only white, while the tarsi are a little longer and more slender.

HABITAT.—Washington, D. C.

Described from several specimens, reared August 5, 1889, from *Œdemasia concinna.* Both of these species probably belong to the genus *Meloboris* Holmgren.

Limneria eureka sp. nov.

Male.—Length, 4.6$^{\mathrm{mm}}$. Black, subopaque, finely, confluently punctate; scape and second antennal joint beneath, mandibles, palpi, tegulæ, anterior and middle coxæ, and trochanters, yellowish-white; legs ferruginous, the hind pair darker; the coxæ and first joint of trochanters, black; there is a large, dusky blotch at base of posterior femora beneath, and the base and tips of tibiæ and the tarsi, except first joint basally, are black. Abdomen black, pubescent; the venter yellowish. Wings hyaline, iridescent; stigma and veins brown; the areolet entirely wanting.

HABITAT.—Los Angeles, Cal.

Described from one specimen taken by Mr. Albert Kœbele in May, 1886.

Limneria salicicola sp. nov.

Female.—Length, 4mm; ovipositor, 0.6mm. Black, opaque, finely, confluently punctate; the abdomen shining black. It agrees well with the description of *L. eureka*, except that there is no blotch on hind femora beneath, and the tibiæ are only faintly dusky at base and tip, the tarsal joints being dusky at tips.

HABITAT.—London, Ontario.

Described from a single specimen reared March 14, 1872, from a *Gelechia* found on willow.

Limneria cupressi sp. nov.

Female.—Length, 3 6mm; ovipositor, about 1mm. Black, densely finely punctate; scape and second antennal joint beneath, mandibles, palpi, and anterior and middle trochanters, yellowish-white; anterior and middle legs, reddish-yellow; the tarsi from apex of first joint, dusky; middle coxæ black basally, the apex of middle tibiæ dusky; hind coxæ and first joint of trochanters, black; legs dark brown; tibiæ pale at the middle, the spurs white. Metathorax areolated. Abdomen black, the lateral ventral edges of second segment and the whole venter yellowish; ovipositor a little longer than the petiole, slightly curved upwards. Wings hyaline, strongly iridescent; stigma and veins pale-brown, the areolet absent.

HABITAT.—Marin County, Cal.

Described from one specimen received from Mr. Albert Kœbele, reared December 6, 1885, from a dipterous gall found on *Cupressus macrocarpus.*

Limneria noctuæ sp. nov.

Male.—Length, 5mm. Black, opaque, punctate; face covered with a dense white pile; scape and the second antennal joint, except a dusky spot above, clypeus, mandibles, palpi, tegulæ, and anterior and middle coxæ and trochanters, yellowish-white; hind coxæ and legs ferruginous, the anterior and middle pairs being slightly paler; posterior tibiæ at base and apex, and their tarsi, except the base of first joint, dusky; base of first joint and tibial spurs. white. Metathorax areolated. Abdomen black, the sides and apices of the segments, red. Wings hyaline, iridescent; stigma and veins brown; areolet absent.

HABITAT.—Washington, D. C.

Described from a single specimen reared July 12, 1884, from an unknown noctuid pupa found on black birch.

Subfamily TRYPHONINÆ.

METOPIUS Panzer.

Metopius xanthostigma sp. nov.

Male.—Length, 14^{mm}. Black; coarsely punctured and sparsely covered with fuscous pubescence. Antennæ brown-black, not reaching to the middle of the abdomen. Face yellow, with a central, long-oval black spot; the face is separated from base of antennæ and surrounded by a sharply defined keel. Palpi dusky; the second joint of labial palpi yellow. A line on upper margin of collar, interrupted medially, the posterior half of the quadrate scutellum, a dot at base of the lateral keels of same, spot below tegulæ and a dot below this, a dot on lower posterior angles of mesopleuræ, large spot on metapleuræ, the sutures between joints of trochanters, extreme apex of femora and anterior and middle tibiæ and tarsi and posterior tibiæ at base, the apical lateral corners of the first abdominal segment, and the apical margins of second, third, fourth, and fifth segments, bright yellow. The middle tibiæ beneath and posterior tibiæ and tarsi, rufous, rest of the legs, black. Abdomen very coarsely, irregularly pitted, the first segment short, bicarinated. Wings fuscous, the stigma and inner margin of costæ yellow, the outer margin and veins black.

HABITAT.—North Carolina.

Described from one specimen. This species approaches nearest to *M. pollinctorius* Say, but it is somewhat differently colored and at once distinguished from that species by the absence of medial carinæ on the second, third, and fourth abdominal segments and by the yellow stigma.

Metopius terminalis sp. nov.

Male.—Length, 8^{mm}. Black, polished and but sparsely punctured. Antennæ brown, the two basal joints black, pale beneath. Face pubescent, not surrounded by a keel. Clypeus, mandibles, and middle and anterior legs, ferruginous; the clypeus is transversely prominent or ridge-like; the fore and middle coxæ black at base; hind legs rufous, the coxæ entirely black, the tibiæ and tarsi obfuscated. Scutellum quadrate keeled at sides and with a slight carina on the middle posteriorly. Metathorax distinctly, coarsely areolated. Abdomen rufous, the first and three terminal segments, except the extreme margins, black. Wings dusky hyaline; the stigma and veins brown.

HABITAT.—Missouri.

Described from one specimen in Riley collection. The non-keeled face of this species is entirely different from all other *Metopii* known to me.

BASSUS Fallen.

Bassus syrphicola sp. nov.

Female.—Length, 7mm. Black, shining; head and metathorax densely punctured. A spot on face, clypeus, mandibles, except teeth, palpi, most of the mesopleuræ, except the portion just beneath anterior wings, mesosternum, the suture dividing the mesopleuræ from the metathorax, metapleuræ and legs, ferruginous; the apex of posterior tibiæ and their tarsi, black; lateral margins of mesothorax, tegulæ, a spot in front and beneath it, a central line on scutellum and a transverse line on postscutellum, white. Metathorax without keels. Abdomen slightly compressed at apex, the three basal segments sculptured, the following segments almost smooth, shining, but showing a fine reticulate punctuation; all the segments are narrowly edged at apex with white and from the third the white color is obliquely dilated at the sides. Wings hyaline, iridescent; stigma and veins brown-black, the stigma with a pale spot at base; areolet wanting.

Male.—Length, 6mm. Agrees with the female except the face wholly and the anterior orbits to summit, the antennæ beneath, clypeus, mandibles, palpi and the whole under surface of the thorax, except a black spot beneath wings, and lateral hook-shaped marks on mesonotum, are wholly white or yellowish-white.

HABITAT.—San Francisco, Cal.

Described from one male and two females received from Mrs. L. A. Burkholder, reared April 29, 1881, from a puparium of a Syrphus-fly found on rose.

Bassus orbitalis sp. nov.

Female.—Length, 5.4mm. Black, shining, punctate. Anterior orbits, lower part of cheeks, clypeus, mandibles, palpi, prosternum, a hook-shaped mark on mesosternum, anterior and middle coxæ and trochanters, a broad band on posterior tibiæ, lateral margins on mesothorax, tegulæ, a spot in front and beneath it, a spot at insertion of posterior wings and extending along the ridge separating the mesothorax from the metathorax, two short lines on disk of mesonotum, a broad medial line on scutellum, and the postscutellum, white. Metathorax with a transverse keel on the upper margin of posterior face and with triangular areas laterally. Legs ferruginous; the posterior tibiæ, except the broad white band at the middle, and their tarsi, black. Abdomen compressed at tips, rugulose, the apices of middle segments and the two or three terminal segments, smooth; the first segment is bicarinated at basal half, and the apex in the middle exhibits a small white stain or line. Wings hyaline; stigma and veins brown; the stigma at base and the costæ basally are pale.

HABITAT.—Alameda, Cal.

Described from one specimen, received from Mr. Albert Kœbele, labeled "Taken ovipositing in a Syrphus larva feeding on cabbage aphis."

Bassus xanthopsis sp. nov.

Male.—Length, 5^{mm}. Black, shining, sparsely punctate. Face, anterior orbits, scape beneath, clypeus, mandibles, palpi, lateral margins of mesothorax, prosternum, posterior lateral angles of collar, anterior margin of mesosternum, a large spot on mesopleuræ below, and anterior and middle legs, including coxæ, lemon-yellow. Hind legs rufous, the coxæ black, their apices and trochanters yellow. Metathorax closely punctate, without keels. Abdomen black, the apex of the second segment, the third wholly, and the apical margins of fourth and fifth, yellow-ferruginous; the first segment is longer than wide, with very prominent lateral tubercles near the base, it, as well as the second segment, sculptured, opaque. Wings hyaline; stigma and veins brown; the costæ to near the stigma and a spot at base and apex of stigma, yellow.

HABITAT.—Alameda, Cal.

Described from one specimen, received from Mr. Albert Kœbele, reared from a *Syrphus* feeding on *Aphis brassicæ.*

This species may be the male of *orbitalis*, but its different color, absence of keels on metathorax, and the difference in the sculpture of the abdomen, make it quite improbable and justify me in considering it a different species.

Bassus euuræ sp. nov.

Male.—Length, 5.4^{mm}. Stature similar to *B. agilis* Cr. Black, shining. A V-shaped mark on face, clypeus, mandibles, except teeth, palpi, tegulæ, a spot in front and beneath, hook-shaped marks at sides of mesonotum, scutellum and postscutellum, white. Legs, including coxæ, the sternum and pleuræ below, ferruginous; the posterior tibiæ, except toward base, and the tarsi, black. The parapsidal grooves of mesonotum are slightly indicated anteriorly; metathorax keeled. Abdomen entirely black, the three basal segments rugulose, subopaque, the first being bicarinated on disk at base, the terminal segments smoother and polished. Wings hyaline, the stigma and veins dark brown; between the stigma and parastigma is a pale spot; areolet absent.

HABITAT.—Placer County, Cal.

Decribed from one specimen, received from Mr. Albert Kœbele, and reared from a saw-fly on willow.

Bassus virginiensis sp. nov.

Female.—5.6^{mm}. Stature similar to *B. euuræ*, black, shining. Face, lower part of cheeks, mandibles, palpi, pro- and mesosternum, lower part of mesopleuræ, coxæ, trochanters, posterior lateral angles of collar, tegulæ, a spot beneath it, and a spot on the disk of scutellum, yellowish-white. Anterior and middle legs, yellow-ferruginous; the middle tarsal joints tipped with black; posterior legs rufous, their coxæ with a large black spot at base above, their tibiæ towards apex and the tarsi, black. The parapsidal grooves are slightly indicated anteriorly; metathorax keeled, the two middle keels close together and converging toward each other at base forming a triangular area. Abdomen black, delicately sculptured, the extreme apical edges of the segments showing a little white; the disk of the first segment being bicarinated for two-thirds its length. Wings hyaline; stigma and veins brown, the inner margin of costæ and basal nervures, yellowish; areolet absent.

HABITAT.—Virginia.

Described from a single specimen. This species comes nearest to *B. euuræ*, but is readily separated from it and other species by colorational details.

PRIONOPODA Holmgren.

Prionopoda scutellata sp. nov.

Female.—Length, 6^{mm}. Robust, yellow-ferruginous; stemmaticum and anteriorly to base of antennæ, disk of mesothorax, except pale parapsidal lines two-thirds the length of mesonotum, disk of metathorax, disk of first abdominal segment, and the apex of posterior tibiæ and their tarsi, black. Antennæ longer than the whole insect, gradually acuminated towards apex, black, the scape and flagellum beneath, ferruginous. Scutellum ferruginous. Head and thorax densely, finely punctured. Metathorax strongly areolated. The head is large, subquadrate, the cheeks as wide as the eye; palpi and anterior and middle coxæ and trochanters, yellowish-white; claws pectinated. Abdomen, except the petiole, which is punctate and broadly widened posteriorly, smooth, polished. Wings hyaline; stigma black, veins brown-black; areolet triangular.

HAITAT.—Washington, D. C.

Described from one specimen taken at large in August.

TREMATOPYGUS Holmgren.

(?) **Trematopygus cultriformis** sp. nov.

Female.—Length, 5^{mm}. Black, shining. Scape beneath, a prominence on middle of face, and legs, including coxæ, ferruginous. Tegulæ, a line beneath and an abbreviated line at sides of mesonotum, yellow; flagellum brown; mesopectus obscurely rufous. Metathorax rugose, areolated. Abdomen sessile, beyond the second segment strongly compressed, cultriform, the first segment more than twice as long as wide, rugulose, the sides keeled above; second segment about as long as its width at base, when viewed from above of a triangular shape, the sides being compressed towards apex; the ovipositor is slightly exserted, a little recurved. Wings hyaline, iridescent; stigma and veins pale brown, the costæ to stigma yellowish; areolet absent.

HABITAT.—Nebraska.

Described from one specimen received from Mr. L. Bruner. The peculiar shape of the abdomen of this species is remarkable, approaching closely to the Cynipid genus *Ibalia*, and it is probably the type of a new genus, although some of the characters seem to agree with the genus *Trematopygus*, in which it is placed temporarily.

ADELOGNATHUS Holmgren.

Adelognathus texanus sp. nov.

Female.—Length, 6.4^{mm}. Robust, black, punctate. The scape towards apex beneath, second antennal joint beneath, mandibles, palpi, apical tips of femora, bases of tibiæ, tegulæ and a line beneath, a large, broad, irregular spot at sides of mesonotum anteriorly, spot at apex of scutellum, postscutellum, and apical margin of all abdominal segments, yellow. The head is transverse; cheeks as wide as the eye; clypeus rounded before and projecting over the mandibles; antennæ 31-jointed, as long as the head and thorax together, black, the first joint of flagellum about three and a half times as long as wide, the following joints gradually becoming shorter and shorter until they are wider than longer. Mesopleuræ rugose; metathorax areolated. Legs rufous; coxæ, except tips and posterior femora, black; tips of coxæ, tips of femora, bases of tibiæ, and base of first joint of posterior tarsi, yellow. Abdomen sessile, coarsely punctate, the first segment bicarinated on disk for two-thirds its length, apical margin of all segments, lemon-yellow; venter yellow; the three terminal ventral segments, black, their apical edges narrowly edged with yellow; ovipositor very short. Wings hyaline; stigma and veins brown, the costæ towards base yellow; the submedian cell is much longer than the median, the cubital nervure abruptly bent before the middle; areolet subpentagonal.

HABITAT.—Texas.

Described from two specimens in Belfrage collection.

ORTHOCENTRUS Gravenhorst.

Orthocentrus californicus sp. nov.

Female.—Length, 3.4^{mm}. Polished black. The swollen face transversely aciculated; a triangular white spot on anterior orbits, just above base of antennæ. Antennæ brown, the scape very long, black. Metathorax areolated, the disk punctate. Legs red, the trochanters yellowish. Abdomen from the middle towards apex compressed, black, polished, the suture between second and third segments and the venter, yellowish, first segment subopaque, minutely rugulose, with two longitudinal keels on disk. Wings hyaline, stigma and veins pale brown, the areolet subpentagonal, the second recurrent nervure interstitial with the inner vein of the areolet.

HABITAT.—Placer County, Cal.

Described from a single specimen, taken by Mr. Albert Kœbele in August.

ISCHYROCNEMIS Holmgren.

Ischyrocnemis carolina sp. nov.

Male.—Length, 7.6^{mm}. Black, shining, sparsely pubescent. Two basal joints of antennæ, legs, tegulæ, upper margin of collar, petiole of abdomen, except a black spot between the spiracles, apical half of second and third segments, apical one-third of fourth and the sixth and seventh entirely, yellow. The flagellum, scutellum, postscutellum and sutures, metathorax, except a black spot at base and the metapleuræ, and the prosternum, ferruginous. The face is only slightly swollen, subopaque, punctate; eyes emarginate opposite base of antennæ; metathorax smooth, polished. All femora swollen, the posterior pair the stoutest, as in genus *Exochus;* claws strongly bent; the coxæ of posterior legs have a large black spot beneath, the femora are mostly black, the tibiæ with a dusky spot at apex, the spurs stout. Wings yellowish-hyaline; stigma and veins brown; the submedian cell is slightly longer than the median; the areolet triangular, petiolated.

HABITAT.—North Carolina.

Described from a single specimen. This is the first species in the genus to be detected in our fauna.

EXOCHUS Gravenhorst.

Exochus rufigaster sp. nov.

Female.—Length, 8^{mm}. Black, polished, sparsely punctured. The face is but slightly prominent, closely punctured, with a small red spot between base of antennæ. Antennæ reach to apex of first abdominal segment, black; beneath, towards apex, brown. Metathorax longer than wide, areolated, the spiracles large, linear. Legs, including coxæ, rufous. Abdomen one-third longer than head and thorax together, dark rufous, except the first segment basally and the three apical segments, which are black; the first segment is bicarinated for half its length. Wings hyaline, the stigma and veins brown.

HABITAT.—Texas.

Described from one specimen in Belfrage collection.

This species approaches nearest to *E. semirufus* Cr., but in that species the abdomen is entirely rufous.

CHORINAEUS Holmgren.

Chorinaeus flavifrons sp. nov.

Female.—Length, 7^{mm}. Black, polished, sparsely punctate, the abdomen more densely punctured, the punctures coarser, and covered with a whitish pubescence. Face and mandibles yellow-ferruginous; palpi yellowish-white; scutellum with lateral keels, the postscutellum bifurcated; metathorax with six longitudinal carinæ, spiracles long-oval. Legs, including coxæ, yellowish-red. Abdomen a little longer than head and thorax together, rather coarsely punctured; the first segment with four longitudinal keels its entire length, and between the two middle keels are two slight channels; the second segment has three keels its entire length; the third with a slight middle keel near its base. Wings hyaline; stigma and veins brown, the second recurrent nervure bent at the middle.

HABITAT.—Wisconsin.

Described from one specimen.

This species is nearest to *C. cariniger* Walsh, but is readily separated from it by the number of keels on metathorax and abdomen.

Subfamily PIMPLINÆ.

COLEOCENTRUS Gravenhorst.

Coleocentrus texanus sp. nov.

Female.—Length, 11^{mm}; ovipositor, 21^{mm}. This species varies from a yellow-ferruginous to rufo-ferruginous; it is polished, the head and thorax with a few scattered punctures. The flagellum is black or brown-black, sometimes pale beneath, joints 8 to 10, inclusive, white, the three basal joints very long; scape and pedicel always ferruginous. Tips of mandibles black. Parapsidal grooves strongly, deeply impressed. Metathorax a little longer than high, sloping off posteriorly, rugulose and areolated; just behind the postscutellum is a small quadrate area and on each side of it a large semicircular area inclosing the spiracles; the central middle area poorly defined. Legs slender, the hind pair very much longer than the anterior pair; the anterior tarsi are twice as long as the tibiæ, the first joint alone being as long as the tibiæ; terminal tarsal joints, claws and tips of joints 2 and 3 of posterior tarsi, black. Wings fusco-hyaline; stigma and veins brown, a yellow spot between the stigma and parastigma; the submedian cell is shorter than the median; the areolet narrowed, the second recurrent nervure joining it towards the apex.

HABITAT.—Texas and Columbia, S. C.

Described from two specimens. One specimen is in the Belfrage collection and is the paler one; the other was received from Prof. G. F. Atkinson from South Carolina, and although much darker in color is structurally identical.

PIMPLA Fabr.

Pimpla yukonensis sp. nov.

Female.—Length, 9mm. Robust, subopaque, black; head and thorax finely alutaceous with an exceedingly fine punctuation; abdomen finely transversely aciculated, the apical segments smoother. Antennæ black, joints 8 and 9 yellowish. Palpi brown. Tegulæ yellowish-white. Metathorax quadrate, roundedly truncate behind, with a transverse keel. Legs rufous, tips of femora dusky, middle tibiæ and tarsi obfuscated; posterior tibiæ and tarsi black; the anterior tibiæ are short, the basal third strongly constricted. Abdomen shaped as in *P. pedalis*, the apical edges of segments narrowly white, the ovipositor being about as long as the posterior tibiæ. Wings hyaline; stigma and veins black or brown black, the areolet quadrate, the second recurrent nervure joining it at the middle.

HABITAT.—Fort Yukon, Alaska.

Described from one specimen taken by Mr. L. M. Turner in 1877.

Pimpla pterophori sp. nov.

Female.—Length, 9.4mm; ovipositor, 4mm. Black, smooth, shining; the abdomen with coarse punctures, the apical margins of segments smooth. Antennæ black, becoming pale towards apex. Palpi yellowish, the two basal joints of labial palpi, black. Tegulæ and costæ of wings, yellow. Legs, including coxæ, uniformly reddish-yellow, the pulvilli and claws, black. Metathorax slightly rugulose at sides, smoother above, the disk bicarinated. Abdomen as in *P. annulipes* Br., the punctures on first segment reticulated, on the disk of the second segment is a rather large, irregular, opaque depression, the surface of which is wrinkled, the surface of the segment surrounding this depression punctured, as are the following segments. Wings hyaline; stigma and veins brown-black, a spot between the parastigma and stigma and the extreme apex of the stigma and the postmarginal vein, yellowish; areolet oblique, quadrate.

HABITAT.—Los Angeles, Cal.

Described from a single specimen, reared by Mr. Albert Kœbele, in March, from a *Pterophorus* living in stems of *Baccharis pilularis*. This species approaches nearest to *P. tenuicornis* Cr., but its slightly smaller size, smoother bicarinated metathorax, differently sculptured abdomen and the clear wings, readily distinguish it.

Pimpla gossypii sp. nov.

Female.—Length, 5mm; ovipositor, 3mm. Black, shining; the head and thorax with a few scattered punctures; abdomen with distinct, coarse punctures. Palpi, trochanters, tibiæ and tarsi, white; the middle and posterior tarsal joints tipped with black; the posterior tibiæ with the apex, and a subbasal annulus, black; rest of the legs reddish-yellow; the apex of posterior femora dusky. Antennæ black, flagellum beneath ferruginous. The parapsidal grooves are indicated anteriorly. Metathorax smooth, the sides slightly punctured, the disk with a small, shallow fovea in the middle. Abdomen black, the disks of the segments obscurely rufous, the first segment a little longer than wide, keeled. Wings hyaline, iridescent; stigma and veins brown, the costæ and a spot between the parastigma and stigma, white; areolet oblique, narrowed at apex.

HABITAT.—Selma, Ala.

Described from one specimen, reared March 7, 1879, from a Tortricid, which feeds in cotton-bolls.

Pimpla xanthothorax sp. nov.

Female.—Length, 8.4^{mm}; ovipositor, 8^{mm}. Head and abdomen black; thorax, except metathorax which is black, orange-yellow. Palpi and legs, yellowish-white. All femora and middle and posterior coxæ and trochanters with a black stripe beneath, the posterior knees and joints of the tarsi tipped with black. Antennæ long, black, the apex of the scape and the pedicel, yellowish. Metathorax smooth, with some sparse punctures. Abdomen coarsely punctured, the segments slightly contracted behind the middle, the first segment a little longer than wide, without keels. Wings hyaline; stigma and veins brown; spot at base of stigma and postmarginal vein, yellow The male is but 6^{mm}. long, and agrees with the female, except the scape and pedicel are white, the black stripe is wanting on anterior femora and on the middle coxæ, trochanters and femora, and the apical tips of posterior tibiæ and the middle and posterior tarsal joints are tipped with black.

HABITAT.—Kirkwood, Mo.

Described from one female and one male, received from Miss Mary Murtfeldt, reared February 24, 1872, from ***Euura S.-nodus*** Walsh, found on willow.

Pimpla aplopappi sp. nov.

Male.—Length, 7^{mm}. Black, shining; head and thorax with some sparse, fine punctures; abdomen coarsely, closely punctured; face covered with a white pubescence. Palpi and anterior legs, except femora, white. Anterior femora and the other legs, reddish-yellow; the posterior tibiæ with a long white stripe in the middle of the outer face, a sub basal spot and the apex, black; the posterior tarsal joints tipped with black. Metathorax smooth, with two indistinct longitudinal carinæ on the disk basally. First abdominal segment one and a third times as long as wide, carinated. Wings hyaline, stigma and veins brown, a pale spot at base of stigma.

HABITAT.—Los Angeles, Cal.

Described from a single specimen received from Mr. D. W. Coquillett, reared from a lepidopterous gall on ***Aplopappus squamosa.***

Pimpla euuræ sp. nov.

Female.—Length, 6^{mm}; ovipositor, 4^{mm}. Head and thorax black, polished; metathorax and abdomen rufous, the mesopleuræ obscurely rufous. In one specimen the thorax is almost entirely rufous. Antennæ 21-jointed, slender, cylindrical, brown. Palpi and tegulæ white. Parapsidal grooves indicated anteriorly. Metathorax with two longitudinal parallel carinæ on disk. Legs honey-yellow, the posterior tibiæ whitish along the upper face. Abdomen rather coarsely punctured, rufous, the apical edges of segments obscured or blackish, first segment broader than long, keeled, sheaths of ovipositor black, very hairy. Wings hyaline, iridescent, the stigma and veins pale-brownish, the areolet oblique, a parallelogram. The male is but 4^{mm} long, the thorax wholly black, the abdomen smoother than in the female, the punctures smaller and less deeply impressed, the abdominal segments much longer, the first is one and one-half times as long as wide. The antennæ in this sex are 20-jointed, otherwise it agrees with the female.

HABITAT.—California.

Described from two females and six males, reared September 9th, 1885, from *Euura* on *Salix californica.*

Pimpla lithocolletidis sp. nov.

Male.—Length, 3^{mm}. Black, smooth, shining; the metathorax and abdomen sparsely punctured. Antennæ 18-jointed, brown, the two basal joints black above. Metathorax longer than high, gradually sloping off posteriorly, punctate, the disk with two indistinct longitudinal keels. Legs brown, the coxæ and posterior femora black, the base and tips of posterior tibiæ and terminal joints of tarsi, dusky. Wings hyaline, iridescent; stigma and veins brown, areolet oblique, narrowed at apex, the second recurrent nervure interstitial with the outer nervure of the areolet.

HABITAT.—Alameda, Cal.

Described from a single specimen received from Mr. Albert Kœbele, and reared from a Tineid, *Lithocolletis* sp., found on *Grindelia robusta.* This species is the smallest species known.

POLYSPHINCTA Grav.

Polysphincta rufigaster, sp. nov.

Female.—Length, 7^{mm}; ovipositor, 2.5^{mm}. Black, shining; lower portion of mesopleuræ, mesopectus, metathorax, except the basal two-thirds of the disk, and abdomen, except the two terminal segments, rufous. Antennæ brown above, yellow beneath. Palpi and tegulæ, yellowish-white. Parapsidal grooves indicated anteriorly. Metathorax quadrate, the apex emarginately grooved near the posterior lateral angles, leaving the angles obtusely prominent. Legs reddish-yellow, the middle and posterior tibiæ banded with white in the middle, the apex and a subbasal annulus on the posterior tibiæ, black, posterior tarsi pale, the joints tipped with black. Abdomen similar to *P. texana* Cr., only a little wider at the middle, the basal five segments rufous, the punctuation finer and more confluent, the segments transverse with subnodose prominences. Wings fusco-hyaline; stigma and veins brown, the areolet entirely wanting.

HABITAT.—Texas.

Described from one specimen in Belfrage collection.

CLISTOPYGA Grav.

Clistopyga pulchripicta sp. nov.

Female.—Length, 7^{mm}; ovipositor, 1.4^{mm}. Black; face, except a line down the middle, anterior orbits to beyond the summits of the eyes, clypeus, mandibles, except tips, base of cheeks, palpi, two basal joints of antennæ beneath, tegulæ, a broad line in front and a short line below, a line on collar above, tip of scutellum. postscutellum, anterior legs and middle coxæ and trochanters, and extreme apical edges of the abdominal segments, white. Antennæ 30-jointed, brown, blackish basally. Thorax: mesonotum trilobed, the lobes, mesopleuræ, except a spot at insertion of wings, metapleuræ, and oblong spots on metathorax above, rufous; metathorax finely, transversely aciculated. Legs, with the above-mentioned exceptions, reddish-yellow. The abdomen is much longer than the head and thorax together, sparsely, finely punctured, and finely pubescent, the first segment longer than wide, the three following segments with oblique grooves laterally as in *Glypta*, and connected with a transverse groove or depression towards the apex, forming disk-like prominences on these segments. Wings hyaline, the stigma and veins brown; no areolet.

HABITAT.—Texas.

Described from one specimen in Belfrage collection.

Clistopyga pleuralis sp. nov.

Male.—Length, 7^{mm}. Head, except disk of vertex inclosing the ocelli, and the occiput, sides of mesonotum, collar, except a line above, scutellum, all pleuræ, sternum, legs, and extreme apical edges of the abdominal segments, white. There is a large red blotch on the disk of the white sides of the mesonotum, another at the base of the mesopleuræ, and a triangular red spot on the scutellum. Middle of mesonotum, metathorax and abdomen black. There is a black dot on the middle coxæ and a black stripe on hind coxæ; base and apex of hind trochanters, tips of hind tibiæ and subbasal annulus, black; the hind tarsi, except the joints basally, dusky. The head and thorax are smooth, polished; metathorax minutely transversely rugulose and then punctured, much longer than high and gradually sloping off behind.

Abdomen linear, finely, transversely aciculated, the first segment about thrice as long as wide and a little wider at the apex than at base, the following segments gradually subequal; the seventh, quadrate. Wings hyaline, iridescent; the stigma and veins brown; the stigma is lanceolate; areolet absent.

HABITAT.—Kirkwood, Mo.

Described from two specimens received from Miss Mary Murtfeldt, reared April 5th, 1873, from the locust leaf-roller (*Gelechia robiniæfoliella?*). A very beautiful and distinct species, not at all related to any of the other described species in our fauna.

GLYPTA Grav.

Glypta leucozonata sp. nov.

Male.—Length, 8mm. Yellowish-white; vertex of head and the occiput, mesonotum, band on middle of collar, spot on mesonotum, two longitudinal bands on metathorax, band across middle of first abdominal segment and bands at base of the following segments, black. The first 9 joints of the flagellum are ferruginous, joints 10 to 14, black, joints 15 to 25, white, the following joints black. Head smooth; thorax moderately closely punctured, the parapsidal grooves indicated anteriorly; metathorax delicately rugulose and faintly areolated. Legs yellow-ferruginous; the anterior and middle coxæ white; all the tarsi white, the first joint of posterior tarsi at base and the tibial spurs, dusky. The abdomen is punctured, the oblique lines on the segments, so characteristic of the genus, become obsolete after the fifth segment. Wings hyaline, iridescent; stigma pale, veins dark brown.

HABITAT.—Kirkwood, Mo.

Described from a single specimen, received from Miss Mary Murtfeldt, reared from *Grapholitha interstinctana* July 12th, 1887.

Glypta xanthozonata sp. nov.

Male.—Length, 6mm. Yellow; antennæ above, stemmaticum, blotch on occiput, three longitudinal bands on mesonotum confluent at base, a spot on propleuræ, two spots on mesopleuræ, base of metathorax dilated towards lateral corners, large spot on posterior coxæ, apex of posterior tibiæ, transverse band across the middle of the first segment of the abdomen, and bands at the base of all the following segments, black. The antennæ are 28-jointed. On the mesonotum and metathorax are some scattered punctures. The scutellum high, convex. The abdomen is sparsely punctured; the apices of segments smooth, impunctured; all the segments but the last two, in addition to the oblique grooves laterally, have a transverse groove towards the apex, forming, with another transverse groove or depression towards base, small shield-like convex prominences on the disk of these segments. Wings hyaline, stigma and veins brown, the areolet absent.

HABITAT.—Kirkwood, Mo.

Described from a single specimen, received from Miss Mary Murtfeldt, reared from an undetermined Tortricid on oak.

LAMPRONOTA Curtis.

Lampronota puritana sp. nov.

Female.—Length, 12^{mm}; ovipositor, 14^{mm}. Stature similar to *L. americana* Cr. Entirely black, subopaque, punctate and finely aciculated; the metathorax more closely punctate and laterally the punctures are confluent, the surface slightly rugose; the abdomen is transversely aciculated and with only a few scattered punctures on the first and second segments, some of the segments showing obscure rufous stains. The anterior and middle tibiæ and tarsi and posterior tarsi dusky-ferruginous, the rest of the legs black. Wings fuscous; venation similar to *L. americana*, only the areolet is subpetiolated and the cubitus is not so strongly curved as in that species.

HABITAT.—Boscowen, N. H.

This species is close to *L. americana* Cr., but readily separated by the color of the legs and abdomen and the subpetiolated areolet.

XYLONOMUS Grav.

Xylonomus Rileyi sp. nov.

Female.—Length, 15^{mm}; ovipositor about 12^{mm} (broken). Black, subopaque; head smooth, shining, with only a few, fine, scattered punctures; the face rugoso-punctate. Antennæ as long as the anterior wing, black, joints 13 to 16 white. Thorax trilobed, somewhat coarsely punctured, the middle lobe posteriorly transversely rugulose; the prothorax above with prominent lateral corners, but not so prominent as in *X. humeralis* Say; pleuræ smooth, polished; metathorax punctato-rugulose, areolated, the posterior lateral corners subacute. Legs, except a white annulus at base of all tibiæ, entirely black. Abdomen but slightly longer than the head and thorax together, transversely aciculated, the first and second segments finely rugulose, fourth, fifth, and sixth segments very short, the fourth emarginated at the middle above, the seventh with a longitudinal groove down the middle. Wings hyaline; venation as in *X. stigmapterus* Say.

HABITAT.—Missouri.

Described from one specimen in Riley collection.

Xylonomus pulcher sp. nov.

Female.—Length, 9^{mm}; ovipositor, 5^{mm}. Head and thorax black; all pleuræ, metathorax, legs, and abdomen, rufous. Anterior orbits, not reaching to summit of eyes and interrupted opposite the base of antennæ, posterior orbits dilated on cheeks, large oval spot on face, palpi, apical half of antennal joint 10 and the following joints to 14 inclusive, sutures of coxæ and trochanters, knees, annulus at base of all tibiæ and under surface of anterior tibiæ, tegulæ, line beneath and the apex of scutellum, white. Tarsi yellowish; two terminal joints of posterior tarsi and the terminal joints of anterior and middle tarsi, black. The head is smooth, polished, finely punctured; thorax densely punctured, longitudinally striated just in front of the scutellum; scutellum and pleuræ finely rugulose; metathorax distinctly areolated. The apex of abdomen beyond the fifth segment blackish; basal segments minutely rugulose; the segments beyond fourth transversely aciculated. Wings hyaline; a small, faint, dusky cloud below the stigma; the stigma, except basal half which is white, and the veins, dark-brown.

HABITAT.—Cadet, Mo.

Described from one specimen, received from Mr. J. G. Barlow.

Xylonomus floridanus sp. nov.

Female.—Length, 18^{mm}; ovipositor, 16^{mm}. Obscure rufous; antennæ, mandibles, anterior legs except tibiæ and tarsi, middle legs except tarsi, and posterior legs except coxæ above basally, and the tarsi, black. All the tibiæ at base are annulated with white; anterior tarsi yellowish, the apical half of the first joint and the last, dusky; middle tarsi black, except the basal half of first joint and joints 3 and 4, which are white; posterior coxæ above basally rufous; the tarsi, except first joint basally and the third and fourth joints which are yellowish, dusky or black. The sculpture of this species is almost exactly as in *X. stigmapterus* Say, and like that species the posterior lateral angles of the metathorax is prolonged into a projecting prominence or tooth. Wings fusco-hyaline; stigma and veins brown, the stigma with a white spot at base.

HABITAT.—Archer, Fla.

Described from one specimen.

DESCRIPTION OF THE YELLOW-FINNED TROUT OF TWIN LAKES, COLORADO.*

BY

DAVID STARR JORDAN AND BARTON WARREN EVERMANN.

Salmo mykiss macdonaldi subsp. nov.

Type No. 41730, U. S. National Museum.

Head, 4 to $4\frac{1}{10}$ in length; depth, $4\frac{1}{6}$ to 5; D. 2, 12. A. 1, 11. B. 10, Scales, 40-184-37, about 125 pores. Length of type, 10 inches; other specimens from 5 to 8 inches.

Body more elongate and more compressed than usual among the trout; head long, compressed, the snout moderately pointed; mouth rather large, the jaws subequal, the maxillary extending beyond the eye, $1\frac{3}{4}$ to 2 in head; hyoid teeth present, small; opercle longer than usual, its greatest length $4\frac{1}{3}$ in head, somewhat greater than eye, its posterior margin strongly convex. Eye $5\frac{1}{3}$ in head; snout $4\frac{1}{8}$; gill rakers short, x + 10.

Scales quite small, and regularly placed. Pectoral fin moderate, $1\frac{2}{3}$ in head; ventrals 2. Caudal moderately emarginate, the lobes equal. $1\frac{2}{3}$ in head.

Color silvery-olive, a broad lemon-yellow shade along the sides; lower fins bright golden yellow in life; no trace of red, except the usual crimson dash under the lower jaw, never wanting in *Salmo mykiss*.

Body posteriorly and on dorsal and caudal fin profusely speckled with small pepper-like spots, smaller than the nostril, and smaller than in any other of the forms of *Salmo mykiss*. Occasionally these spots are numerous on the anterior part of the body, and even on the head, but usually they are very sparse before the dorsal fin. A round dark diffuse blotch on cheek behind eye.

Pyloric cœca about 40.

Stomach containing some vegetable matter, bones of suckers, and what appears to be a very large flat white worm, apparently swallowed as part of its food.

About ten specimens of this species were taken with the fly in the lower Twin Lakes, about 15 miles southwest of Leadville, a beautiful mountain lake tributary to the Arkansas River.

Most of the specimens were taken by Mr. George R. Fisher, of Leadville, a very enthusiastic and very well informed angler who first made known to us the existence of the species, and accompanied our trip in search of it.

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* Advance sheets of this paper were distributed January 20, 1890.

There are two kinds of trout native to this lake, the yellow-fin or "Salmon Trout," above described, and the smaller "Greenback Trout," also found in the Arkansas and Platte, *Salmo mykiss stomias.*

The yellow-fin trout lives largely on the gravels and about the north or sunny side of the lake. It reaches a weight of 7 to 10 pounds, the very large fish being usually taken with the spear; specimens of 13 pounds' weight are reported. The species never leaves the lake except to spawn, and most of them spawn in the lake. It has never been seen in the river, and rarely in very deep water.

This fish feeds freely on young suckers and even on young trout. It spawns in spring, and the suckers infest its spawning beds, devouring the eggs.

The flesh of the yellow-fin trout is very pale, and more watery than that of the other trout of Colorado. In flavor, its flesh is not inferior to the other species. The color of the flesh may be due to the fact that it feeds on fishes rather than on crustacea. The "Greenback Trout" (*S. m. stomias*) feeds on crustacea and has very red flesh.

We have taken pleasure in naming this species for Hon. Marshall McDonald, U. S. Commissioner of Fisheries, in recognition of his services in spreading the range of *Salmonidæ* in America.

UNIVERSITY OF INDIANA, *January* 10, 1890.

CONTRIBUTIONS TOWARD A MONOGRAPH OF THE NOCTUIDÆ OF TEMPERATE NORTH AMERICA—REVISION OF SOME TÆNIOCAMPID GENERA.

BY

JOHN B. SMITH.

(With plates XXII-XXIII.)

Of a somewhat distinctive habitus is a series of genera grouped about the genus *Tæniocampa.* Without any isolating characters, they form an intermediate series allied to *Mamestra* on the one hand, and to the *xyliniform* genera on the other, with little spurs in all directions—even to the *Heliothinæ* through *Trichoclea.* All of them have hairy eyes, and they constitute a large part of the hairy-eyed genera in our fauna. As a whole the forms treated in this paper are easily separable from all the other hairy-eyed genera by the habitus—that peculiar feature which is appreciated at sight, but which often defies description. As a rule the species are hairy, or, if the vestiture is scaly, it forms no distinct tuftings. The sole exception of the genera treated here is *Barathra* Hbn., which distinctly belongs to the earlier series, and is included here simply from motives of convenience. From like motives *Nephelodes* is omitted, though it belongs more nearly here than where it stands in Mr. Grote's list. It is an important link in the series connecting *Tæniocampa* with *Mamestra.* From *Anarta*, the round eyes distinguish this series; from *Leucania* the color and maculation, which is never pale, strigose. The other hairy-eyed genera are distinguished in my synopsis of genera (Bull. Bkln. Ent. Soc., Aug.. 1882, vol. v.). The possession of round hairy eyes and a habital resemblance to *Tæniocampa* determines the reference here. It is not intended to convey the idea that there is any such association between the genera treated here as to authorize any definite terms expressing family or tribal relation.

Barathra Hbn. has already been said to resemble habitally the genus *Mamestra.* It is our only hairy-eyed genus with a distinct claw terminating the anterior tibia. The front is not modified. There are two American species occurring at opposite sides of the continent.

Trichoclea is peculiar by the rough, full clypeus, and the peculiar armature of the fore tarsi which have the outer side furnished with a series of claw-like spines. The habitus is like *Tæniocampa*, and yet is not unlike some of the Heliothid genera.

Scotogramma contains large species with powdery squammation, dark-gray colors, and a strong resemblance to *Mamestra* in habitus. It has none of the tuftings, however, and the characters are negative rather than positive. Mr. Grote has referred two of the species to

Anarta despite the round eyes, while Moeschler referred his ***phoca*** to *Dianthœcia.*

Ulolonche contains small species with trigonate primaries and weak characters, save as to the genitalia, which are alike in all the species. The genus contains a *Mamestra*, a *Tæniocampa*, and a species described as new, but which I shall not be much surprised to recognize eventually as a described species of *Orthosia.*

Himella is a typical *Tæniocampid* genus with reddish, luteous, or dusky colors, close, smooth, glistening vestiture, and rather wide, large wings, compared with the body.

The composition of the genus is quite different from that proposed by Mr. Grote, ***intractata*** being assumed as the type, since ***furfurata*** is a *Tæniocampa.*

Crocigrapha is recognizable by the retracted anal angle of primaries, the wings being also rather elongate.

Orthodes contains species with rather small, broad or obtuse winged primaries and generally more or less glistening vestiture. The under side of primaries in the male has the cell rather densely clothed with fine, long, silky hair.

Tæniocampa contains species varying quite considerably in wing form, vestiture, and general habitus, several types of genital structure being apparent. Six groups are recognizable, mainly held together by their distinction from *Orthodes*, viz, the cell not clothed with silky hair.

Perigrapha is distinctive. The fore wings have the apices marked, acute, the thorax has an anterior divided crest, and a larger, truncate, basal tuft, while in most of the species the ordinary spots are confluent, or at least contiguous.

In order to bring out somewhat more comprehensively the relationships or differences in the genera, and the groups of *Tæniocampa*, the following table is added:

Fore tibiæ with a claw at tip; thorax tufted; habitus of a *Mamestra;* front smooth. BARATHRA.
Fore tarsi with a series of long spines or claws outwardly; habitus of a Tæniocampa; front rough, bulging.................................TRICHOCLEA.
Fore legs entirely unarmed, save the ordinary spines of tarsi.
  Antennæ of male simple or slightly serrate; not bristled.
    Primaries trigonate with well-marked apices and oblique outer margin.
      Moderate or rather large-sized species with ample wings, usually dark-gray colors and powdery squammation..........................SCOTOGRAMMA.
      Small species, shorter winged, the harpes of ♂ long, slender, subequal, with irregular long spinules at tip; clasper long, curved, slender..ULOLONCHE.
      Moderate-sized species with large primaries, rather frail bodies; close, smooth, glistening vestiture; harpes of ♂ narrow, not spinulose at tip, clasper long and stout..HIMELLA.
    Primaries elongate, subequal, hind angle retracted...............CROCIGRAPHA.
    Primaries obtuse, apices and outer margin rounded.
      Cell of ♂ primaries beneath clothed with long, fine, silky hair....ORTHODES.
      Cell of ♂ primaries beneath not so clothed ....TÆNIOCAMPA.
        Harpes of ♂ truncate at tip; color white......................Group ***palilis.***

Harpes of ♂ bent near tip; colors dark .... Group *furfurata*.
Antennæ of ♂ serrate and bristled .... TÆNIOCAMPA.
Primaries obtuse, outer margins rounded .... Group *rufula*.
Primaries with marked apices and oblique outer margin .... Group *alia*.
Antennæ of ♂ bipectinate.
Primaries obtuse; outer margin rounded .... Group *oviduca*.
Primaries with oblique or angulated outer margin, rectangular apices, abdomen untufted .... Group *incincta*.
Primaries with apices extended, subfalcate, outer margin rounded; abdomen with a large, truncate basal tuft; thorax with an anterior divided crest. PERIGRAPHA.

The slides of genitalia made during the progress of my studies on this group are all in the U. S. National Museum, as are also the types of most of my species, together with good series of most of the specimens. The material in this collection has served as the base upon which this work has been built.

The species not noticed here in any way do not belong to the genera to which they are referred in the lists. Mr. Morrison's species *Tæniocampa vegeta* and *T. earina* are samples of such

I believe that I know all the species save *orobia* Harvey and *agrotiformis* Grt., which I have never identified in collections.

BARATHRA Hbn.

Verzeichniss, 218.

Copimamestra GRT., Ann. and Mag. N. H. [London], 1883, 54. Tr. Kans. Ac. VIII, 55.

Eyes hairy, tibiæ not spinose, anterior with a single long curved claw at tip. The front is smooth, the vestiture rather coarse, scaly; head somewhat retracted, palpi not attaining the vertex. Thoracic vestiture dense, scaly, giving the thorax a square outline; a divided anterior, and somewhat truncate posterior tuft. Dorsum of the abdomen tufted, and in the male there are small lateral tufts. Antennæ of male simple, or slightly ciliate. Primaries elongate, widening outwardly; apices distinct; outer margin oblique. The genitalia of the male are peculiar. The harpes are suddenly constricted toward tip, and then modified into a deeply excavated shell with irregular outlines. Toward the outer margin this shell is densely clothed with spinules. The clasper is a very short beak-like projection at the point of constriction of the harpes.

This genus is very like *Mamestra;* so like, indeed, that the European entomologists do not recognize in their species *brassicae*, a distinct generic type. The character—armed tibia, combined with hairy eyes, is, however, so unusual, that it obtains considerable value and, added to the very peculiar genitalia of the male, seems to authorize the genus.

Hübner first proposed the generic term *Barathra* in the verzeichniss, and Mr. Grote afterward described the genus *Copimamestra* with the same type.

There are two species thus far discovered, which may ultimately prove races of the one. The male of one is unknown to us, and an examination of the genitalia is required to make certain. Both species are closely related to the European *brassicae*, but are distinct in genital structure, though, maculation alone considered, they would be correctly classed as varieties of one species. The male specimens of *brassicae* have on the under side of the abdomen, near the base, two long, thin, brushes of yellow hair, which are wanting in the American forms. *Occidenta* Grt. comes from New Mexico; *curialis* Smith from Maine, strikingly illustrating the remarkable character of the fauna of the latter State.

Occidenta has the ordinary spots well marked, whitish, the s. t. line preceded by a white shade; there is a greenish patch near base. The male I have not seen.

Curialis has the ordinary spots less defined; the reniform white marked; orbicular concolorous, almost obsolete. The green patch is wanting. The male only is known.

Brassicae of Europe differs from both the American forms by the paler ground, and the more evident transverse maculation. The genitalia and the yellow tuftings of the male, however, furnish the important characters.

Barathra occidenta Grt.

Ann. and Mag. N. H. [London], 1883, 54. Trans. Kans. Ac. VIII, 55, *Copimamestra.*

Sordid fuscous brown, with black, scaly irroration. Transverse lines indistinct, but traceable; geminate. Basal line distinct, geminate, black; the included space pale. T. a. line upright, scarcely irregular. In the inferior portion of sub-basal space is a mossy-green patch. T. p. line outwardly bent over reniform, strongly incurved below. S. t. line white, irregular, with strongly marked W on veins 3 and 4, preceded by a broad greenish shade which extends to and includes the apex. S. t. space else concolorous. Terminal space narrow, powdery. A row of black terminal lunules. Claviform, narrow, rather short. Orbicular, moderate in size, with pale filling. Reniform, rather large; white. Head and thorax concolorous with primaries. Secondaries at base pearly whitish, outwardly blackish. Beneath pale, powdery, with incomplete common line and faint discal spot. Expands 1.60 inches (40^{mm}).

HABITAT.—New Mexico.

The species has at first sight a casual resemblance to *M. adjuncta*, from which, however, it is readily distinguished by the generic characters.

Barathra curialis Smith.

Proc. U. S. Nat. Mus., 1887, x, 470, *Copimamestra.*

Blackish fuscous, with a reddish tinge through basal and s. t. space, slightly marked also through centre of median space. Basal line geminate, indistinct, interrupted. T. a. line upright, hardly traceable.

T. p. line single, black, strongly dentate, its course as a whole nearly parallel with outer margin. S. t. line whitish, interrupted, its course somewhat irregular; a prominent W mark on veins 3 and 4. A row of distinct terminal lunules. In the sub-basal space inferiorly is a faint greenish tint, resembling that of *B. occidenta*, but much less marked. Claviform outlined, concolorous. Orbicular barely outlined, concolorous, its outer margin touching the t. a. line. Reniform moderate in size, white, with a central dark lunule which has the margins irregular, interrupting the white in every direction. S. t. space paler than balance of wing, strigate and irrorate with ground color; darkest at costa. Terminal space outwardly pale powdered. Head and thorax concolorous with primaries. Secondaries smoky, fuscous, outwardly darker. Beneath dark-gray, powdery with incomplete extra discal line and distinct discal spot. The genitalia are described; the differences between those of this species and of *brassicae* are shown in the figures. Expands 1.70 inches (43^{mm}).

HABITAT.—Kittery Point, Me.

The type is a perfect male in Mr. Thaxter's collection. It is barely possible that this is a variety or race of *occidenta*, but the probabilities are that it is a good species and it is so described.

I have since seen a specimen of this species, taken at Franconia, N. H., by Mrs. Slosson.

TRICHOCLEA Grt.

Papilio, 3, 30, 1883.

Eyes hairy; front full, subglobose, rough, scarcely tuberculate. The head is not retracted, the vestiture rather close, not divergent; mixed scales and hair. Body robust, the vestiture mixed or hairy, forming none or but an indistinct tuft at base. Legs moderate, the tibiæ not spinose, anterior usually armed at outer side of tip with a stout curved spine; sometimes there are two spines, one above the other. The first joint of anterior tarsi has a series of three or four stout curved spines, of which the terminal is largest; the second joint has a similar series, which are shorter and straight. Primaries moderately elongate, outwardly widening, the apices rectangular, outer margin obliquely rounded. Abdomen untufted. The male genitalia resemble those of the *liquida* group of *Mamestra*, the harpes being suddenly and nearly rectangularly bent toward tip. In detail they are distinct, and will be separately described for each species. The colors in the species thus far known are luteous or gray. The armature of the anterior tibia and tarsi is peculiar and somewhat variable; the permanent feature is the terminal long curved spine on first and second tarsal joint, and two longer spines near base of first joint. They are easily broken, and the apparent discrepancy in my material may be accounted for in this way. Mr. Grote in his description fails to mention this armature, and erroneously says the eyes are lashed.

Two species are thus far known—*decepta* Grt. which has the front very full and bulging, the vestiture scaly and ordinary spots distinct, and *edwardsii*, which has the front scarcely full, the vestiture hairy, and the ordinary spots indefinite. The latter is a more robust species and has the abdomen indistinctly tufted. The male antennæ in both are simple. This peculiar genus resembles in armature *Mycteroplus* of Europe, which, however, has naked eyes. Its affinities are with *Mamestra* rather than *Tæniocampa*, and the species are not unlike some of the pale *agrotids* in habitus.

Tricholea decepta Grt.

Papilio 3, 30, 1883.

Luteous gray, more or less irrorate with black. Median lines indistinctly geminate; t. a. upright, waved, included space somewhat paler; t. p. crenulate, its course nearly parallel with the outer margin. Basal line distinct, geminate, blackish. A distinct, rather narrow, dusky shade through outer portion of median space, darkening the reniform. S. t. space darker than ground color, defining the rather evenly dentate s. t. line. A terminal row of black lunules. Claviform variable in size, but usually distinct, narrowly black lined. Orbicular round, small, concolorous, black ringed. Reniform moderate, black ringed, inferiorly dusky. Secondaries pearly white with broad dusky outer margin, and sometimes a transverse row of venular points. Beneath white, outwardly powdery; a distinct, dotted, common line, rather large discal dot on both wings. The genitalia are distinctive. The harpes are abruptly bent toward the tip, which is rounded, and inwardly spinulose. There is a short, stout, acute corneous basal process; near to the bend of the harpes is a rather long, curved, corneous hook, and between the two a broad, flat, somewhat spatulate, semi-membraneous process. Expands 1.12 to 1.28 inches (28 to 32^{mm}).

HABITAT.—Arizona.

Several specimens are before me. A single rubbed female from California indicates a new species. The front is much as in *decepta*, but with an added small tubercle. It is rather larger, paler in ground color, but more densely powdered with black. Pending the discovery of the male I leave it undescribed.

Tricholea edwardsii Smith.

Proc. U. S. Nat. Mus., 1887, x, p. 478.

Powdery ash gray; terminal space distinctly paler. Basal line indicated by a geminate black spot on median vein. T. a. line marked on costa only, and by a small brownish dot in place of claviform. T. p. line marked by a series of dark venular points, and an incomplete line of white scales. Median shade marked on costa. S. t. line marked by the pale terminal space, and a row of dusky spots. A row of small black terminal lunules. Orbicular very large, obsolete, marked only by two curved dusky spots ( ), indicating the outer margins. Reniform faintly outlined, inferiorly dusky. Head and thorax concolorous. Secondaries white, with broad blackish outer margin, fringes white. Beneath, primaries white with darker powderings, reproducing very faintly the maculation of upper side. Secondaries immaculate, white. The genitalia are of the same type as *decepta*, but the basal projection is wanting; the slender hook is replaced by a short beak-like clasp, and the spatulate projection is much larger and more prominent. Expands 1.40 inches (35^{mm}).

HABITAT.—California.

A single perfect male in Mr. Edwards's collection. This species differs very evidently from *decepta* as well in structure as in maculation, but is perfectly congeneric. The front is not so full; the body is shorter, more robust; the vestiture hairy, long, and the primaries are somewhat more pointed. The pale terminal space well distinguishes it at a glance. Many additional specimens have been since seen, and several are in the collection of the Museum, taken by Mr. Koebele.

SCOTOGRAMMA Smith.

Proc. U. S. Nat. Mus. 1887, x, 469.

Eyes hairy, tibiæ unarmed, vestiture either hairy or scaly. Antennæ of male simple. Form moderate, wings ample; primaries trigonate, with marked apices and oblique outer margin. The head is retracted, the palpi well developed, always exceeding front. Thorax with usually more or less obvious anterior and posterior tufts.

This genus has no strong characters and is almost entirely a negative one. Two well-marked groups are formed in it, of which the first is the more typical, *submarina* being typical of the group and genus. It is the only species of which the male is known to me.

This first group is characterized by hairy vestiture and rather smoothly clothed front.

Submarina is luteous gray, without s. t. line, but distinct, single median lines, the s. t. crenulate. The orbicular is wanting, the reniform indistinct. The male genitalia are hereafter described.

Phoca, of which *promulsa* is a synonym, is nearly allied to the preceding, but the s. t. line is distinct. In the Labrador form (*phoca*) the color is paler, more whitish; in the Colorado form (*promulsa*) there is a fuscous suffusion.

Perplexa is an evenly powdered gray form with all the maculation present, but obscured; the presence of the claviform distinguishes it from either of the preceding.

The remaining species belong to the second section, which is characterized by scaly vestiture, quadrate thorax and front with superimposed scaly tufts.

Inconcinna is a dark fuscous species, in which the last ventral segment is foveate on each side, and the edges form an incurved margin to the dorsal surface of the abdomen.

Umbrosa is a smaller species, dark, blackish-gray in color, and with the last segment of abdomen simple. In both the species the normal noctuid markings are present, and essentially alike, so that it is difficult to find any difference in ornamentation. The ground color seems constant, however, as does also the difference in size, and the peculiar difference in the terminal segment of female abdomen.

In tabular form the species are as follows:

Vestiture hairy.
  Luteous gray, s. t. line wanting .... SUBMARINA
  S. t. line present.
    Fuscous; paler or darker, claviform wanting .... PHOCA
    Ash gray; claviform present; lines geminate .... PERPLEXA
Vestiture scaly; front with superimposed tufts.
    Fuscous brown; abdomen of ♀ with last ventral segment foveate at sides, and incurved on dorsal margin .... INCONCINNA
    Dark ash gray; smaller; abdomen of ♀ normal .... UMBROSA

These species are nearly all represented in the Museum collection.

Scotogramma submarina Grt.

Can. Ent. 15, 4 (*Anarta*); Smith, Proc. U. S. Nat. Mus., x, 1887, p. 469, *Scotogramma*.

Pale luteous gray, with black powderings. Median lines distinct, single, black. Basal line marked. T. a. line upright, or somewhat outwardly oblique; outwardly curved in submedian space, and dentate on vein one. T. p. line strongly crenulate, its course about parallel with the oblique outer margin, the median space thus considerably narrowed inferiorly; s. t. line wanting; a row of small, lunate, terminal spots. A variably distinct, somewhat diffuse shade line crosses outer portion of median space, obscuring the reniform, which is hardly defined; orbicular obsolete; secondaries smoky fuscous, whitish toward base. Beneath pale, powdery, with more or less complete, somewhat punctiform outer line, and small discal spot. Head and thorax concolorous, vestiture, with flattened hair intermixed, forming indistinct fore and aft tufts. The genitalia of male have the harpes and clasper equally curved, and nearly equal in length, *i. e.*, the clasper reaches to the tip of the harpe, though arising hardly one-fourth from that point. Both are obtusely terminated, the clasper corneous, the harpes membraneous, and set with fine hair. The last segment of the female is also somewhat peculiar. On the under side it is carinate, at the middle deeply foveate, each side broader than the dorsal portion of same segment and forming an incurved margin. The segment is broader than those immediately preceding it. It is furnished with a tuft of hair. giving additional prominence. Viewed from above, when clothed with vestiture, it has the appearance of a deep fovea at each side. This structure is not peculiar to this species, but has not been previously described. Expands 1.10 to 1.24 inches (28 to 31^{mm}).

HABITAT.—Arizona, Montana, Oregon.

A very distinct species, recognizable by the pale color and distinct black lines. How Mr. Grote ever persuaded himself that this species could be referred to *Anarta* is one of those mysteries that will probably never find a solution.

Scotogramma phoca Moeschl.

W. E. M. 8, 197, pl. 5, f. 15 (*Dianthœcia*); Grt., Can. Ent. 13, 130 (*Mamestra.*)

promulsa Morr. Ann. Lyc. 1875, 97 (*Mamestra*); Grt. C. E. 1875, 7, 223 (*Anarta*) *id.*, 1881, 13, 127 (*Anarta*); Stett. Ent. Zeit. 1876, 37, p. 135 (*Anarta*); Smith, Bull. Bkln. Ent. Soc. 1882, 5, 68, *Mamestra.*

Sordid, pale luteous gray, with fine powderings. Median lines, fine black, sometimes indistinct, single. T. a. line upright, outwardly angulate in s. m. space; t. p. line parallel with outer margin, irregularly dentate. S. t. line marked by a series of preceding fuscous spots, more or less connected, and sometimes forming a dark shade. An indistinct median shade. Stigmata obsolete or but very faintly outlined. Secondaries even pale luteo fuscous. Beneath powdery, with faint discal lunule. Expands 1.20 to 1.40 inches (30 to 35^{mm}).

HABITAT.—Labrador, Colorado.

A comparison of types leaves no doubt of the identity of *phoca* and *promulsa.* The former is paler, more whitish, the latter with a fuscous tinge throughout. The maculation and habitus is, however, the same. Unfortunately no males have been seen, so that the matter could have been settled finally.

Scotogramma perplexa Smith.

Proc. U. S. Nat. Mus., 1887, x, 469.

Dull, fuscous gray, with blackish powderings, all the maculation indistinct. Median lines barely traceable; t. a. angulated; t. p. dentate. S. t. line marked by faint pale powderings, not defined. Orbicular large, oval, with pale powderings. Reniform scarcely traceable, marked by a few scales. The claviform is faintly indicated. Secondaries evenly fuscous. Beneath dark, powdery, without line or spot. Head and thorax concolorous with primaries, abdomen with secondaries. Expands 1.50 inches (37^{mm}.)

HABITAT.—Colorado.

The type is a unique female in the collection of Mr. F. Tepper. The thorax is rather slight, the vestiture divergent, loose. The uniform dark powdery gray primaries sufficiently characterize this species.

Scotogramma inconcinna Smith.

Proc. U. S. Nat. Mus., 1887, x. 469.

Dark fuscous, with black powderings, all the lines and spots distinct. Basal line geminate, black. T. a. line obsoletely germinate, inner portion faint. Slightly arcuate, outwardly curved in the interspaces. T. p. line geminate, parallel with outer margin, with dents on the veins, followed by pale points. S. t. line irregular, pale, punctiform, accompanied by blackish shades. A row of black terminal lunules. Secondaries blackish fuscous, with pale fringes. Beneath dark, powdery, with indistinct discal lunule. Head and thorax concolorous with primaries; the thorax with indistinct fore and aft tufts. Abdomen with a distinct, truncate tuft at the first segment. The terminal segment of female is as in *submarina.* Expands 1.40 inches (35^{mm}).

HABITAT.—Colorado.

The type is a female in fair condition. Ultimately it may prove referable elsewhere, when the male is studied, but its habitus and general structure seem rather to place it with *submarina*, and the structure of the last segment of the female abdomen confirms the reference. The vestiture is a mixture of scales and flattened, hair, and the thorax in form is quadrate. The frontal vestiture forms two superimposed tufts. The species seems thus more nearly allied to *Mamestra*, while differing obviously from any species known to me.

Scotogramma umbrosa Smith.

Proc. U. S. Nat. Mus., 1887, x, 470.

Dark, blackish gray, powdered with white scales. All the maculation present, though not prominent. Median and basal lines geminate, the defining lines faintly marked, the included space powdered with white. T. a. line outwardly oblique, with inward dentations on veins. T. p. line about parallel with outer margin tolerably even. S. t. line irregular, pale, punctiform, somewhat obscured by the pale powderings which are most numerous in the s. t. space. An interrupted dark terminal line. Claviform distinctly outlined; concolorous. Orbicular moderate, round, with white powderings. Reniform large, upright, pale powdered, well defined. Secondaries blackish, paler toward base. Beneath variably dark, powdery, with outer dark line and small discal spots. Head and thorax concolorous, with primaries. Expands 1.20 to 1.30 inches (30 to 32^{mm}).

HABITAT.—Arizona, Colorado.

Three female specimens are before me. The vestiture is scaly, and the tufts of thorax, abdomen, and front are like those of *inconcinna.* There is no special modification of the last segment of the abdomen.

Scotogramma stretchii Edw.

Hy. Edw., Can. Ent., 1887, xix, 146.

"With much of the general appearance of *Perigea falsa*, Gr., but said by Mr. J. B. Smith to belong to his new genus *Scotogramma.* Dark stone drab, the lines blackish, all much confused, and the ground color of the wing covered with brownish irrorations. Basal half line indistinct. T. a. line nearly straight, with a deep tooth anteriorly pointing toward the base. T. p. line dentated, outwardly joining the reniform in a darker cloud. Marginal line lost in a row of dark clouds. Intronervule spaces, pointed with black lunules. The basal, median, and submarginal spaces are pale by contrast with the dark lines. Lower wings a dull stone drab, a little paler toward the base. Underside uniform stone drab, with very distinct darker discal spots and a median band common to both wings. Margins also dark. Thorax and abdomen concolorous. Exp. wings 32^{mm}. One female, two males. Colorado Desert. R. H. Stretch."

This species is a distinct one, but having no specimens at hand, I can not place it exactly. I give, therefore, Mr. Edwards's original description, which will be sufficient to enable the species to be recognized.

ULOLONCHE SMITH.

Proc. U. S. Nat. Mus., 1887, x, 471.

Eyes hairy, tibiæ not spinose or in any way armed. The body is plump, stout, rather densely clothed with hairy or-mixed vestiture on thorax, forming a more or less obvious divided anterior crest and distinct posterior tuft. Abdomen rather elongate, slender, untufted. Head somewhat, or considerably retracted, the palpi well developed, reaching the middle of front. Primaries rather small, short, trigonate, with marked apices and oblique outer margin. The genitalia are practically alike, differing only in minor details. The harpes are narrow, slender, elongate, subequal, terminating in an obliquely rounded tip, which is inwardly furnished with long spinules. The clasper is long, slender and curved, subequal throughout, and obtuse at tip. The male antennæ are simple.

Three species are referred to this genus. *Niveiguttata*, which differs from others by the more retracted head, plump form and small wings, is also easily distinguished by the distinct geminate white spot on disc of primaries just beyond and touching the inferior portion of reniform. There is no possibility of mistaking this species.

Modesta and fasciata are closely allied, less robust, and with somewhat more ample primaries. They agree also in the type of maculation: in both, the outer portion of median space being darker, somewhat V-shaped. In *fasciata*, however, the contrast is great, glaring, the large yellow reniform adding to the definition and distinguishing the species, while *modesta* is a quiet mouse-gray form, with no strong contrasts of color, and concolorous or slightly darker reniform.

Like most of the surrounding genera, this has no prominent distinguishing feature, unless the genital structure is so regarded. The habitus, wing form, and proportions of body combine to form the necessary generic characters.

To again present the differences between the species, we add the following table:

Stouter, shorter winged; primaries with a geminate white spot below and beyond reniform...NIVEIGUTTATA
Less stout; primaries somewhat more ample, outer portion of median space darker.
  Very pale gray, dark portions blackish, reniform contrasting, yellow....FASCIATA
  Mouse gray, dark portions umber brown, reniform concolorous or slightly darker, MODESTA

Ulolonche niveiguttata Grt.

Buf. Bul. 1, 140, pl. 4, f. 16, *Mamestra.*

Sordid fuscous brown, powdery, the median lines irregular, interrupted, indistinct. S. t. line prominent, pale, outwardly diffuse, marked with yellow and white scales. A row of pale terminal dots. An indistinct dark basal streak. Claviform small, black marked. Orbicular large, irregular, concolorous, imperfectly defined in black. Reniform large, upright, concolorous, outwardly marked with yellow; inferiorly the outer angle is invaded by a large geminate white spot, characterizing the species. Secondaries dark blackish brown. Beneath dusky, powdery, without lines or spots. Head and thorax concolorous. Expands .90 to 1 inch (23 to 25^{mm}).

HABITAT.—California, Arizona.

An easily recognizable form; the distinct geminate white spot on primaries, and diffuse pale s. t. line are characteristic. A specimen from Arizona differs in having a rosy shade through primaries. The underside is paler, with distinct outer line and discal spot.

Ulolonche fasciata Smith.

Proc. U. S. Nat. Mus., 1887, x, 471.

Gray in basal and s. t. space, with fuscous powderings; in median space even, with a bluish tint; terminal space darker. Basal line evident, geminate. T. a. line geminate, brown, straight from costa to submedian interspace, then with a long inward, followed by an equally long outward tooth. T. p. line geminate, even, outwardly bent over reniform, then evenly oblique to hind margin. S. t. line marked at inception by a dark preceding costal shade, thence indefinite, and traceable only by the faint contrast between s. t. and terminal space. A black shade fills the outer portion of median space, making a somewhat V-shaped blackish shade in wing. Orbicular obsolete. Reniform large, contrasting, yellow, oblong. Secondaries blackish, paler at base. Beneath pale, with black irrorations, an incomplete outer line and a broad powdery median fascia. Head and thorax concolorous, bluish gray. Expands 1 inch (25^{mm}).

HABITAT.—New Mexico. (Prof. F. H. Snow, No. 51.)

A very bright and distinctly marked species. The dark V-shaped outer portion of median space, with the large, yellowish reniform, is characteristic and distinctive.

Ulolonche modesta Morr.

Pr. B. S. N. H., 1874, 144 (*Dianthœcia*); Grt., C. E., 1879, XI, 27 (*Graphiphora*), *id.*, 1881, XIII, 126 (*Tæniocampa*).

Mouse gray, rarely more reddish, more often with a blue-gray powdering; outer portion of median space darker, umber brown; terminal space usually somewhat paler, more bluish gray. Median lines generally distinct, umber brown. Basal line angulated. T. a. line geminate, the inner part of line often wanting; its course outwardly oblique, strongly angulated. T. p. line geminate, usually rather faintly marked, its course parallel with the outer margin. S. t. line marked by an irregular preceding shade, which is sometimes broken into spots. The orbicular is obsolete; reniform absorbed in the outer dark shade, usually traceable, the inferior portion blackish. Secondaries fuscous, even, fringes paler. Beneath dark fuscous, powdery, with a more or less incomplete outer line and variably distinct discal spot. Head and thorax concolorous. Expands 1.10 to 1.20 inches (28 to 30mm).

HABITAT.—New England, Middle States, Canada.

A quietly marked species, distinguished by the darker brown coloring of the exterior portion of median space. Two female specimens from Arizona are referred here, but may ultimately prove specifically distinct. The gray is more luteous, powdery. There is little or no contrast between the inner and outer portions of median space, and the primaries seem more elongate. Pending the discovery of the male, it would be unsafe to describe it as distinct.

HIMELLA GRT.

Pr. Ac. N. Sc. Ph. 5, 200.

Eyes hairy, tibiæ unarmed; vestiture of flattened hair with intermingled scales. Frontal vestiture rather smooth, even. Palpi well developed, reaching to or exceeding middle of front. The antennæ of male have the joints bead like, furnished with lateral tufts of bristles. The body parts are slight, smoothly scaled, without tufts, the abdomen elongate, especially in the male. The primaries are large, trigonate, with rectangular apices and roundedly oblique outer margin. The harpes of the male in *intractata* are narrow, elongate, with a rounded tip. Clasper long, stout, corneous, reaching nearly to the end of the harpe and resting in a groove.

Two species are known which are referable to this genus, and separable from *Tæniocampa* by the frail form, large wings, and smooth, somewhat glistening vestiture. They are easily distinguished.

Intractata is fawn colored, with large, pale-ringed, ordinary spots, faint median and distinct s. t. lines.

Thecata is dark, blackish-gray, with obsolete ordinary spots, distinct median lines and without s. t. line. The genitalia of the male of this species will probably be found much like those of *intractata*.

Himella thecata Morr.

Pr. Ac., 1875, 59 (*Mamestra*); Grt., C. E., 1880, 12, 186 (*Graphiphora*), *ibid.*, 1881, 13, 126 (*Tæniocampa*).

contrahens Grt., Bul. Surv. 4, 180; C. E., 1880, 12, 186 (*pr. syn.*).

Dark fuscous gray, with blackish powderings. The ground color is luteus, and is variably distinct, so that sometimes a specimen is evenly dark gray, while another is irregularly blotchy. Median lines always distinct, geminate, the defining lines concolorous, the included space discolorous, pale luteous. S. t. line obsolete. Apex usually pale, and sometimes this pale shade invades the s. t. space. A diffuse, darker shade through outer portion of median space, darkening the reniform, which is outwardly defined by a few pale scales. Orbicular obsolete. Secondaries pale luteous, glistening; outwardly smoky; a black terminal line, and a faint dusky median line and discal spot. Beneath white, with black powderings, broad black outer lines and distinct discal dots. Head and thorax concolorous. Expands 1.10 to 1.30 inches (28 to 33^{mm}).

HABITAT.—New York, New Hampshire, Nebraska, Colorado.

Easily recognized by the dark glistening primaries and the pale median lines. The species is widely distributed, but is nowhere common. Oddly enough, the females only seem to be captured. I have seen but a single male and that lacked the abdomen.

Himella intractata Morr.

Pr. B. S. N. H., 1874, 160 (*Tæniocampa*).

fidelis Grt., Pr. Ac., 1874, 201 (*Himella*), C. E., 11, 27 (*Graphiphora*).

Grayish fawn color, somewhat powdery. Basal line interrupted, marked by black scales on costa and in s. m. space. Median lines geminate, very faintly marked; t. a. upright, somewhat sinuate, outwardly marked opposite orbicular, and in s. m. interspace by black spots. T. p. line parallel with outer margin, inwardly marked on s. m. interspace with black. S. t. line distinct, pale, sinuate inwardly, black marked. Ordinary spots large, concolorous, distinctly pale ringed. Secondaries pale fuscous gray, outwardly darker. Beneath pale, powdery, with incomplete, interrupted dusky line and a distinct discal spot on secondaries. Head and thorax concolorous, with primaries. Expands 1.20 to 1.40 inches (30 to 35^{mm}).

HABITAT.—New York, Massachusetts, Missouri.

A very distinct species, not readily confused with anything else known to me. The bright fawn color, clearly pale ringed ordinary spots, and the black spots on the transverse lines in s. m. interspace, are all peculiar features.

CROCIGRAPHA Grt.

Can. Ent., 7, 57, 1875.

Eyes hairy, tibiæ unarmed. Vestiture hairy, with few scales intermixed. Thorax with an inconspicuous divided crest. Abdomen untufted. Primaries elongate, subequal, the hind angle strongly retracted. Habitus of *Tæniocampa* genuina, from which it differs principally by the retracted hind angle of primaries and the more or less evident divided thoracic crest. The male antennæ are simple.

The single species belonging to this genus can be immediately recognized by the wing shape and the pale median lines. The harpes of the male are subequal, the tip oblique and fringed with spines. The clasper is rather short curved, hook like, tapering to an acute point. This genus is very unsatisfactorily separated from the typical genus *Tæniocampa*, but where the characters for generic separation are so scarce, even those which elsewhere would not be recognized must be used to prevent unwieldy assemblages of species. Especially is that necessary in this group of hairy-eyed genera.

Crocigrapha normani Grt.

C. E., 1874, 6, 115 (*Perigrapha*); Morr., C. E., 1874, 6, 251 (*Tæniocampa*); Grt., *id.*, 1875, 7, 57 (*Crocigrapha*); *id.*, 1875, 7, 227, pl. 1, f. 13.

Varies from reddish luteous to rather deep red brown, always more or less powdery; the superior portion of median space often darker, especially between the ordinary spots. Median lines geminate, even, the included space pale, bluish gray; the defining lines not much darker than ground color. T. a. line evenly and slightly outwardly oblique. T. p. line curved over reniform, then strongly incurved, nearly parallel with the outer margin. S. t. line obsolete, or defined only by the slightly darker terminal space. In dark specimens the apex is pale and the line is marked at that point. Stigmata large, concolorous, reniform inferiorly black marked; outlined by pale scales; orbicular often obsolete. Secondaries soiled, whitish, outwardly darker. Beneath pale, with more or less evident punctiform outer line and a discal dot on secondaries. Head and thorax concolorous, with primaries. Expands 1.30 to 1.60 inches (33 to 40^{mm}).

HABITAT.—New England and Middle States.

The genitalia are described in the description of the genus, and there is nothing to add to the remarks there made.

ORTHODES Gn.

Noct. I, 371. Morr. Can. Ent., 6, 251 (list and char.).

Eyes hairy, tibiæ unarmed. Thorax without tufts, or with only an indefinite anterior crest and posterior bunch of loose hair. Abdomen untufted. Primaries short, broad, with rectangular or obtuse apices, and rounded or nearly straight outer margin. Frontal vestiture rather coarse, mixed. Palpi well developed, reaching to middle of front. Second joint, club shaped; third distinct, cylindrical. On the under side of primaries the cell is clothed with long silky hair, somewhat more dense in the males, and in some species forming brushes or tufts in that sex. The antennæ are simple in both sexes.

From *Tæniocampa* this genus is distinct by the wing shape, which is characteristic, by the silky hair on cell beneath, and by the longer, better developed palpi. Some of the species have been heretofore classed as *Tæniocampa*, and the genera are very closely related.

Infirma and *cynica* differ from all others by having the clasper of the male genitalia double, and superficially by the pale ringed ordinary spots, the orbicular being large and oblique. *Infirma* is easily distinguished by a triangular black spot at the middle of the collar, the two lobes of which are inferiorly separated. The median lines, too, are narrow and pale, while the ground color is rather a dark mouse gray. *Cynica* is more reddish, and the median lines are irregular and black; the males have a very distinct tuft of appressed hair beneath.

The remaining species never have the ordinary spots pale ringed; the orbicular is often obsolete, and the reniform rarely distinctly defined. The median lines are often more or less obsolete, while the s. t. line is always marked.

Vecors, or *enervis* (why Gueneé changed the name I do not know), is usually red brown, with fairly evident median lines, obsolete orbicular and usually white marked reniform. The s. t. line is usually marked only by an irregular dusky shade, which is often interrupted. The species is decidedly variable, and yet not easily confounded with any other.

Virgula is similar, but is a more slender species. The median lines when visible are dark, and very strongly and irregularly dentate. The s. t. line is characteristic, and is marked only by a series of sagittate dashes, one of which usually crosses the s. t. space. It is a sordid dark, blackish-brown species, in which the ordinary spots are rarely traceable and never clearly defined.

Irrorata is a brown-red species, sprinkled with coarse black atoms, the median lines distinct, accompanied by broad luteous shades. S. t. line pale, diffuse, preceded by a dark shade.

The three preceding forms agree in essential gentital structure. The harpes are more or less obliquely terminated, and the clasper is hollowed out or somewhat spoon-shaped; in *virgula* and *irrorata* moderate in size, in *enervis* curiously exaggerated.

Puerilis differs from all others by the pale luteous color, the clean white reniform, and distinct white s. t. line. The male genitalia are also peculiar, the harpes being very peculiarly terminated, while the clasper is single, hook-like, acute. The genitalia of all the species are hereafter more particularly described.

In tabular form, the differences are shown as follows:

Ordinary spots, large, pale ringed; orbicular oblique.
  Lobes of collar inferiorly separated, leaving a triangular black patch; median lines narrow, pale .... INFIRMA
  Lobes of collar not separated; median lines black .... CYNICA
Ordinary spots more or less indefinite, never pale ringed.
  S. t. line marked by a dark preceding shade, median lines when visible, fairly even; reniform usually clean, white marked; color usually brown red, ... ENERVIS
  S. t. line preceded by long, sagittate dashes; median lines when visible very irregular, dentate; reniform obsolete or dirty white marked; sordid dark brown .... VIRGULA
  S. t. line distinct, pale, somewhat diffuse outwardly; red brown, black powdered: median lines distinct, accompanied by broad pale shades .... IRRORATA
  Luteous, pale; median lines never accompanied by paler shades .... PUERILIS

Orthodes infirma Gn.

Gn., Noct. I, 1852, 375; Walk. C. B. Mus., Het. x, 446, *Orthodes;* Morr. C. E., 1874, 6, 252; Harv. Buff. Bul., III, 9.

Even mouse gray, with a more or less obvious reddish tinge. All the lines distinct, narrow, pale, even. Ordinary spots pale ringed, sometimes connected. Basal half-line rigid, upright. T. a. line evenly oblique, with a narrow, dark outer shading. T. p. line angulate over reniform, then evenly inwardly oblique to hind margin, preceded by a row of black venular dots. S. t. line very distinct, even, rarely with accompanying darker shade. A row of dark terminal lunules, margined by a zigzag terminal line. Orbicular large, oblique; reniform broad, kidney shaped. Secondaries even, fuscous, variable in shade from yellowish to blackish. Beneath dull smoky. Secondaries with outer line and discal spot. Head and thorax concolorous. Lobes of collar inferiorly separated, leaving a triangular space, filled by a black patch. There is a faint thoracic crest, and loose, indistinct abdominal tufts. The genitalia of the male are peculiar by the tuft of long silky hair on the harpes; the latter are broad, narrowing to an irregular, obtusely pointed tip. The clasper is double, consisting of a curved, beak-like process, behind which is a straight corneous process, squarely truncate at tip. Expands 1.20 to 1.40 inches (30 to 35^{mm}).

HABITAT.—New England and Middle States, Missouri, Texas.

An easily distinguished form, common in the Middle States. The triangular black patch at base of collar and the lengthily tufted harpes of the male are distinctive.

Orthodes cynica Gn.

Gn. Noct. 1852, I, 375; Wlk. C. B. Mus., Het. x, 443, *Orthodes;* Morr. C. E., 1874, 6, 252,
nimia Gn., 1852, I, 376; Wlk. C. B. Mus. Het. x, 443, an sp. dist.; Morr. C. E., 1874, 6, 252 (pr. syn.).
candens Gn., 1852, I, 376; Wlk. C. B. Mus. Het. x, 444, an sp. dist. præc.; Morr. C. E., 1874, 6, 252 (pr. syn.).

Mouse gray to bright brownish red; the vestiture somewhat "squammose." Median lines darker, usually black; t. a. line preceded, t. p. line followed by a pale shade. Both lines are slightly arcuate and more or less dentate or angulate on veins, but in this respect the variation is so great that it is useless to attempt description. Usually the lines are rather close together, but even this is not constant. The t. p. line is followed by a row of distinct venular points. S. t. line pale, hardly sinuate, preceded by a somewhat darker shade. A row of dark terminal lunules, often faint or obsolete. Ordinary spots concolorous or slightly darker, narrowly pale ringed, orbicular very oblique. Secondaries yellowish, fuscous. Beneath, powdery. Secondaries with indefinite outer line and discal spot. Head and thorax concolorous. Harpes of male broad, slightly narrowing to the obtusely rounded tip. Clasper double, a curved, somewhat beak-like hook, and behind is a much longer corneous process, slightly bent only at tip and nearly attaining the tip of harpes. Expands 1.16 to 1.28 inches (29 to 32^{mm}).

HABITAT.—Northern United States, Nova Scotia, and Canada.

The broad primaries, with usually approximated and distinct black lines, distinguish this species. In the male there is also a dense patch of fine hair on the underside of primaries, just beyond and below the middle. This is in addition to the silky hair clothing the discal cell.

Orthodes enervis Gn.

Gn., Noct. III, 420; *id.* I, 376 (*vecors*); Wlk. C. B. Mus. Lep. Het. X, 444; Morr. C. E , 1874, 6, 253 (*Pseudorthodes*).

Var griseocincta Harv., Buff. Bull., 1873, 2, 120; Morr., C. E., 1874, 6, 253 (*pr. var.*); *nitens* Grt. Papilio 1883, III, 31.

Red brown, varying greatly in shade, often powdered with white scales. Median lines rarely distinct, often obsolete; blackish. T. a. line outwardly oblique, lunate. T. p. line crenulate, parallel with and rather close to outer margin; often accompanied by a pale shading. A dusky shade through outer portion of median space, angulate below reniform. S. t. line marked by a preceding black shade, often emphasized by pale scales, never distinct. Orbicular wanting. Reniform usually marked by white scales, rarely paler red. Secondaries smoky fuscous, fringes pale. Beneath, powdery, with common outer line, usually incomplete on primaries, and a distinct discal lunule on secondaries. Head and thorax concolorous. Harpes of male subequal, somewhat curved, obtusely rounded at tip. The clasper is a long, broad, curved, somewhat spoon-like process, unlike any other form known to me. Expands .90 to 1.25 inches (23 to 32^{mm}).

HABITAT.—Atlantic States to District of Columbia.

A remarkably variable form, easily known by the obsolete orbicular white-marked reniform, and the dark shade preceding s. t. line. *Griseocincta* I have not seen, and am not certain it is properly referred as a variety. Both Mr. Grote and Mr. Morrison so place it, and they are probably right.

Orthodes virgula Grt.

Papilio 3, 76 (*Tæniocampa*).

Sordid smoky or blackish brown, median lines variably distinct, broad, blackish, sometimes obsolete. T. a. line outwardly oblique, with a long, inward tooth on vein 1. T. p. line geminate, crenulate, not quite parallel with outer margin; more upright. S. t. line interrupted, marked by pale scales, preceded by black sagittate dashes, one of which usually crosses the s. t. space opposite the cell. A faint median shade line. Orbicular rarely defined. Reniform obsoletely marked by a few dirty white scales. Secondaries smoky fuscous. Beneath powdery, with variably distinct outer line and discal spot. Head and thorax concolorous. The harpes of the male are broader toward tip, oblique, inwardly fringed with stiff hair. The clasper is a small, spoon-shaped process, with a small, curved tip. Expands 1 to 1.10 inches (26 to 28^{mm}).

HABITAT.—Arizona, Colorado.

An obscure, sordid species, defined by the sagittate black marks preceding s. t. line. The thoracic vestiture is rather loose and long, the abdomen of male long and slender. The primaries have the costal margin somewhat concave at middle, the apices rectangular, outer margin straight to below middle, then very obliquely rounded to hind margin.

Orthodes irrorata Smith.

Proc. U. S. Nat. Mus., 1887, x, 478.

Red brown, powdery; median lines distinct, accompanied by broad, luteous shades. T. a. line waved, with a wide outward bend at middle. T. p. line crenulate, nearly parallel with outer margin. S. t. line broad, diffuse, pale, preceded by a dusky shade. An interrupted terminal line; fringes pale, dotted at base. A more or less indistinct shade line through outer portion of median space. Orbicular small, indefinite, luteous. Reniform narrow, upright, indefinite, luteous. Secondaries blackish, paler in some specimens. Beneath, powdery, with a broad, diffuse outer shade, black. A distinct discal spot on secondaries. The harpes of male gradually narrow to an obtuse tip, inwardly fringed with hair. The clasper is concave, somewhat curved, the tip corneous, acute. Expands 1.10 to 1.20 inches (27 to 30^{mm}).

HABITAT.—State of Washington.

Readily recognizable by the pale shades accompanying the transverse lines, as well as the coarsely powdered primaries. The broad, diffuse outer line of under side seems also characteristic. The types are with Messrs. Graef (female) and Hy. Edwards (male).

Orthodes puerilis Grt.

Buff. Bull. 1873, 2, 64 (*Mamestra*); C. E., 1879, 11, 26 (*Graphiphora*) *id.*, 1881, 13, 126 (*Tæniocampa*).

Reddish luteous, sometimes with a blackish suffusion, often powdered with white scales. Median lines indistinct, irregular, often entirely wanting. T. a. geminate, variably sinuate, sometimes only a narrow pale line. T. p. geminate, more or less interrupted or punctiform. S. t. line always distinct, pale, tolerably even, preceded by a darker shade. A row of pale terminal spots. Orbicular obsolete or punctiform. Reniform usually white marked, rarely reddish. Secondaries fuscous to blackish, with paler outer margin and fringes. Beneath with a more or less distinct outer shade line; secondaries with discal spot. Head and thorax concolorous. Harpes of male with superior margin irregular, but straight; inferior margin gradually and evenly curved to meet the superior margin in an obtusely rounded angle. Clasper rather long, curved, corneous, acutely terminated. Expands 1 to 1.20 inches (25 to 30^{mm}).

HABITAT.—California.

Easily recognized by the pale colors and the very distinct pale s. t. line. Some specimens of *virgula* approach this species in maculation, but are separable by the spots, which in the former precede the s. t. line. In *puerilis* the line is either distinctly pale through a darker ground or it is preceded by a darker *shade*. The thorax has an anterior crest and a distinct posterior tuft.

TÆNIOCAMPA Gn.

Essay p. 477; Noct. I 346.

Eyes hairy, tibiæ unarmed, vestiture hairy or mixed, never entirely scaly, on thorax forming loose fore and aft tufts, or smooth, even, without tuftings. Abdomen untufted. Front with fine woolly clothing, palpi usually short, hardly attaining front, drooping; rarely well developed and ascending. Antennæ of male simple, serrate, or pectinate, the species dividing naturally into groups on this character. Primaries ample, or short, obtuse.

The genus *Tæniocampa* as above defined embraces a number of groups easily distinguished, and yet with the same general habitus. The species are usually reddish luteous, or some combination of brown, red, and yellow, and either have rather short, obtuse primaries, or rather large wings with marked apices and oblique outer margin. The groups, though well defined, hardly deserve elevation to generic rank, and can be distinguished by the following table:

Primaries with outer margins rounded, apices obtuse.
  Antennæ of ♂ simple .... Group FURFURATA
  Antennæ of ♂ serrate and bristled .... Group RUFULA
  Antennæ of ♂ bipectinate .... Group OVIDUCA
Primaries with apices marked, outer margins oblique.
  Antennæ of ♂ heavily bipectinate .... Group INCINCTA
  Antennæ of ♂ serrate and bristled .... Group ALIA

By this course tolerably compact groups are formed, all easily united under one generic term, and all confusing or exceptional material is excluded. By the order of groups adopted, the species follow naturally the species classed as *Orthodes*, and as naturally lead to *Perigrapha*, though, perhaps, the opposite method of cataloguing would be more natural.

The species belonging to group *furfurata* agree not only in wing form but in the genital structure. The harpes are broad, suddenly bent and narrowed near the tip, which is somewhat dilated, lappet-like, and fringed with spinules. The angle formed by the bend is usually produced or acute. The species referable to this group are separable as follows:

Vestiture entirely hairy.
  Luteous, irrorate with blackish; no median shade .... FURFURATA
Vestiture, with scales intermixed.
  Dark red brown .... PERBRUNNEA
  More reddish; heavily black marked, orbicular distinct .... PEREDIA
  Dark mouse gray; all the maculation obsolete, orbicular wanting ...... UNIFORMIS

There is little danger of mistaking these species, and further distinctions here seem unnecessary.

Group *rufula* contains species less closely allied in genital structure than those of the preceding group, but resembling each other so closely in habitus that their relationship is obvious. It joins naturally to the preceding as the table shows.

Vestiture flattened hair, front not evenly clothed.
  Median lines narrow, dark, barely visible .... COLUMBIA
Vestiture hairy.
  Median lines very distinct, pale, even; t. a. very oblique.
    Rather deep luteous gray .... MODIFICA
    Very pale yellow .... CONSOPITA
  Median lines interrupted, punctiform .... RUFULA

Columbia is at once distinct by the vestiture; it has also an inconspicuous tuft on abdomen, and reverts to the *Mamestra* type.

Modifica and *consopita* are probably races of one species. The maculation is alike, and only the difference in ground color separates them. As no male of *consopita* is available for examination, a final conclusion can not be reached.

Rufula is easily recognized. Mr. Grote has named *perforata*, what is probably a color variety of this species, and which is again referred to hereafter.

Group *oviduca* contains but two species; the type of the group, and *utahensis*, readily distinguishable as follows:

S. t. line subobsolete, pectinations of male antennæ short.
  Reniform inferiorly black filled .... UTAHENSIS
S. t. line very distinct, pale; pectinations of male antennæ longer .... OVIDUCA

Though there is no remarkable agreement in genital structure among the species in the two last preceding and the following groups, yet it is worthy of note that there is everywhere, though not in each species, a tendency to a double clasper, or rather to an additional corneous process, varying from a mere rudiment to a stout spatulate process or large hook. No generalizations are attempted, and the attention of the student is called to the plate, where he can make his own comparisons.

Group *incincta* is less compact than any of the preceding. The antennæ are bipectinate, the primaries with marked apices and oblique outer margin.

Incincta and *suffusa* are comparatively slight species, with elongate, slender abdomen. The former is rather obscure luteous brown, the s. t. line preceded by a dark shade, the stigmata concolorous, rather faint. The latter is more gray, brighter, yet not sharply marked, the s. t. line *followed* by a dusky shade, the stigmata large, distinct, pale.

The remainder of the species are plump, heavily-built insects, with usually short, conic abdomen.

Obtusa is a small, broad-winged form, very dark gray, maculation obsolete, secondaries white. It fits nowhere, very naturally, and is wedged in here as being most easily recognizable at this point. The other species are large insects with dirty fuscous or luteous secondaries.

Pectinata is reddish-luteous, powdered with black scales, the lines interrupted, pectinations of antennæ very long. It is an easily recognized species, the peculiar color and very regular black speckles giving the appearance of thinly scaled wings.

Terminata is a pale luteous form, with darker s. t. space, which renders the terminal space paler by contrast; it is, however, a shade paler than ground color at any rate.

Subfuscula is aberrant in color, and indeed somewhat in habitus, but is after all best placed here. The primaries are ash gray, the median space somewhat darker, and the transverse lines are distinct, black, dentate. Mr. Grote placed the species in *Anarta*, but it seems to have little in common with that genus. In tabular form the differences appear as follows:

Slender, slight species, abdomen elongate.
S. t. line preceded by a dark shade, ordinary spots concolorous, indistinct. INCINCTA
S. t. line followed by a dark shade, ordinary spots distinct, pale.......... SUFFUSA
Stout, robust species; abdomen shorter.
Small, primaries short, broad, dark gray, maculation obsolete, secondaries white, OBTUSA
Large species; secondaries not white.
Reddish luteous, powdered with black; lines interrupted; pectinations of male antennæ very long.. PECTINATA
Pale luteous; s. t. space darkest, relieving and rendering prominent the pale terminal space.. TERMINATA
Ash gray, median space darker, transverse lines distinct black, dentate, SUBFUSCULA

Tailing off the genus is the group *alia* or *incerta*. For a long time *alia* was considered synonymous with the *incerta* of Europe, and so Mr.

Grote catalogues it in his new list, referring *pacifica* also as a synonym. A careful study of the forms has led to the conviction that not only is *alia* distinct from *incerta*, and *pacifica* from *alia*, but there is also a third species closely related but entirely distinct from *alia*. This I name *subterminata*. It is perhaps more common than *alia*, and is very generally confused with it in collections.

The species are separated by the following table:

Paler species.
  S. t. line consisting of a row of black, lunate spots .... ARTHROLITA
  S. t. line continuous, *preceded* by a darker shade.
    Line even .... PACIFICA
    Line sinuate .... ALIA
  S. t. line *followed* by a darker shade, median space, with outer portion usually darker .... SUBTERMINATA
Dark, blackish brown species.
  Terminal space paler, collar concolorous .... GARMANI
  Terminal space concolorous, collar reddish, pale .... PRÆSES

All agree in general habitus and the serrate and bristled antennæ. *Arthrolita* is distinguishable at a glance by the peculiar s. t. line. *Pacifica* is difficult to separate from *alia* on color characters, and reference is made to the detailed descriptions hereinafter contained. *Alia* is a powdery form, with the maculation rather indistinct, except that the terminal line is well marked and preceded by a darker shade. It is a very constant species. *Subterminata* is brighter in color, the maculation distinct, outer portion of median space darker; s. t. line followed by a darker shade. It is an exceedingly variable species. *Garmani* and *præses* are allied to *Perigrapha*; indeed the latter species was described as belonging to that genus. They differ from all the others in the group by the dark-brown ground color. In *Garmani* the collar is concolorous, the terminal space discolorous. In *Præses* the exact reverse is the case. There is thus no difficulty in distinguishing them.

Tæniocampa furfurata Grt.

Pr. Ac. 5, 201, 1874 (*Himella*) Can. Ent. 11, 27, 1879 (*Graphiphora*), New List 1882 (*Tæniocampa*).

Luteous, powdered with blackish scales. Median lines geminate, blackish. T. a. line arcuate, but slightly dentate. T. p. line often more or less interrupted, outer line often punctiform; nearly parallel with outer margin. S. t. line concolorous, slightly sinuate, marked by a preceding dusky shade and the darker s. t. space. Ordinary spots concolorous or somewhat darker, pale ringed. Orbicular rather small, round. Secondaries pale fusco-luteous, lighter toward base. Beneath powdery, with more or less complete outer line, and distinct discal spot. Head and thorax concolorous. The superior angle of the bend of the harpes is rounded, the tip dilated, inwardly spinulose. The clasper is moderate, not much curved, acutely terminated, rather slender. Expands 1 to 1.20 inches (25 to 29^{mm}).

HABITAT.—California, Colorado, Arizona, Illinois, New York.

Widely distributed but nowhere common. It resembles a small *rufula*, but the antennæ are simple in the male. It is the only species in its group with hairy vestiture and luteous color, so that it is readily recognized.

Tæniocampa perbrunnea Grt.

Can. Ent. 11, 28, 1874, *Graphiphora*.

"* * * In color recalling *Hadena fractilinea*, but more reddish. Veins black. Reniform narrow, black, bordered outwardly by a white streak. Median space superiorly shaded with black. T. p. line even, angulated on vein 5, opposite the disk, followed by venular dots. Orbicular indistinct, concolorous, defined by black scales. Fringes black, with white venular dots. Veins broadly marked with black on terminal space. S. t. line shaded anteriorly with brown. Ground of the wing bright reddish brown. Hind wings blackish, with contrasting pale reddish fringes. Thorax reddish brown, abdomen blackish, with reddish lateral and anal hairs. Beneath pale, with distinct exterior common line, even on fore wings, dentate on secondaries, which latter show the discal dot distinctly." The harpes of male have the superior angle of the bend acutely produced. The tip is but slightly enlarged, inwardly spinulose. The clasper is short, very stout, beak-like and corneous. Expands 1.20 inches (30^{mm}).

HABITAT.—California.

Mr. Grote's description is transcribed because the specimens before me are not sufficiently perfect to describe from. There is no danger of confusing this with any other species of this group.

Tæniocampa peredia Grt.

Papilio 3, 32, 1883.

Reddish luteous, with carmine and black powderings. Basal line distinct, geminate. T. a. line outwardly arcuate and sinuate, geminate. T. p. line outwardly curved over reniform, inwardly curved beneath; inner line narrow, black, continuous, outer line punctiform. S. t. line tolerably even, concolorous, marked by the somewhat darker terminal space and a faint dusky preceding shade. A distinct dusky shade darkening the outer portion of median space. Orbicular moderate, round, slightly paler. Reniform invaded by the dusky shade, which is inferiorly more distinct; a few white scales serve to define the spot at this point. Secondaries pale, soiled, fusco-luteous. Beneath pale, powdery, with an interrupted outer line, punctiform on secondaries, and a distinct discal dot. Head and thorax concolorous with primaries. The male harpes are inferiorly lobed, superiorly the margin is concave and the angle of the bend strongly and acutely produced; the tip is but little dilated, and rather sparsely spinulose. The clasper is reduced to a flattened obtuse protuberance; the curved, somewhat thickened, upper margin of side piece serving the same purpose. Expands 1.10 inches (28mm).

HABITAT.—Maine (Kittery Point).

Easily recognized by the distinct round orbicular. The frontal vestiture is rather coarse, scaly, and there is a distinct divided tuft behind collar. This species is closely allied to *Mamestra*, with the balance of characters in favor of *Tæniocampa.*

Tæniocampa uniformis Smith.

Proc. U. S. Nat. Mus., 1887, x, 472.

Rather dark mouse gray, powdery; median lines obsolete, barely traceable. T. p. line marked by a row of venular dots. S. t. line slightly sinuate, concolorous, marked by the somewhat darker terminal space and a preceding dusky shade. Reniform marked by a dusky patch, orbicular wanting. Secondaries soiled white, outwardly darker, an indistinct discal lunule. Beneath with incomplete outer line, a distinct discal lunule. Head and thorax concolorous, with primaries. The harpes have the superior margin thickened, corneous, obtusely produced at the angle of bend, and forming the clasper. The tip is somewhat dilated and densely spinulose at inner side. Expands 1 inch (25mm).

HABITAT.—Arizona.

Closely related to *peredia*, but sufficiently distinct by the dark color, obsolete maculation and small size. In this species the clasper is not separate, but formed of the superior margin of side piece, which is thickened. There is an indistinct thoracic tuft behind collar.

Tæniocampa columbia Smith.

Proc. U. S. Nat. Mus., 1887, x, 472.

Luteous reddish, powdery, terminal space somewhat darker, veins slightly darker. Median lines single, obsolete or but little darker. T. a. outwardly arcuate, inwardly toothed on vein 1. T. p. line parallel with outer margin. S. t. line slightly paler, defined principally by the slightly darker terminal space. Ordinary spots obsolete, or very faintly traceable, the reniform marked by a slightly darker inferior shade. Secondaries dirty fuscous, paler toward base. Beneath rusty, powdery, with a common outer line. Antennæ of male serrate and bristled. Head and thorax concolorous. Harpes of male narrowing beyond middle, somewhat dilated at tip, and inwardly fringed with spines. Toward base is a stout, strong corneous hook, which is obtusely terminated. Near to tip is another, slender, semi-membraneous and but slightly curved hook. Expands 1.15 to 1.25 inches (29 to 31mm).

HABITAT.—Northwestern British Columbia.

This species is one of those collected by Captain Geddes in 1884, and the types, male and female, are in Mr. Neumœgen's collection. It is one of those perplexing forms that it is difficult to classify properly. The vestiture consists of flattened hairs. There is an incomplete basal tuft on thorax, and in the male a distinct tuft near base of abdomen. The male abdomen is also laterally tufted. The front is clothed with a mixture of scales and hair, and the palpi reach nearly to the middle of the front in the male. All these characters indicate a *Mamestra*, but the habitus of the insect is so like *Tæniocampa*, and the male genitalia are so closely allied to those of *rufula*, that provisionally at least, I refer the species here.

Tæniocampa modifica Morr.

Pr. B. S. N. H., XVII, 1874, 150.

consopita Grt. Papilio 1, 154, 1881, *Graphiphora*.

Luteous to very pale yellow, with darker powderings, median lines very distinct, even, pale, with somewhat darker margin. T. a. line evenly outwardly oblique. T. p. unusually close to, and entirely parallel with, outer margin. S. t. line rarely distinct, not complete in any specimen I have seen, sinuate, pale. A narrow, pale terminal line. Ordinary spots pale ringed, concolorous, or very slightly darker. Orbicular punctiform. Secondaries soiled whitish, or luteous, paler toward base. Beneath powdery, with a complete dark outer line and discal spot on all wings. The male harpes are subequal to the obliquely rounded tip, which is inwardly irregularly set with long, slender spinules. The clasper is a long, slender, rather abruptly bent hook. Near to the inferior margin a short, flattened, obtuse, corneous process. Expands 1.20 to 1.40 inches (30 to 35^{mm}).

HABITAT.—New York, Massachusetts, District of Columbia.

The variety *consopita* Grt. is much paler yellowish, but otherwise precisely like the type form. It is from Arizona.

Since the manuscript of this genus was first completed I have seen a number of specimens from other localities, without, unfortunately, noting them. They prove absolutely the identity of *modifica* and *consopita*, the ground color being not geographical as I had at first supposed. I have left the manuscript as originally written.

Taeniocampa rufula Grt.

Buf. Bul. 2, 64, 1874 (*Dianthoecia*). C. E., 11, 26, 1879 (*Graphiphora*), id. 13, 126, 1881 (*Taeniocampa*).

Pale clay-yellow to brick-red, powdered with white scales. Median lines faint, usually only the pale included space visible. T. a. line outwardly oblique, sinuate. T. p. line sinuate, usually followed by a row of black venular dots. S. t. line distinct, pale, irregularly sinuate, preceded by a darker shade. A narrow, pale, terminal line. Ordinary spots pale ringed, concolorous or but little darker. Secondaries soiled whitish, outwardly darker. Beneath, pale, powdery with distinct discal dots, and incomplete, punctiform outer line. Head and thorax concolorous, the latter inconspicuously tufted. Abdomen with indefinite, loose, hairy tufts at base. Male harpes rather abruptly narrowed toward tip, which is somewhat dilated and inwardly spinulose. There are two, moderately curved, rather long corneous hooks forming claspers. Expands 1.20 to 1.25 inches (29 to 32^{mm}).

HABITAT.—California.

This species, though very variable in ground color, is yet tolerably constant in maculation, and readily known by the plump appearance and faint irregular median lines combined with the group characters.

Taeniocampa perforata Grt.

Papilio 3, 73, 1883.

"Of a peculiar grayish-fuscous or stone color, and allied to the Californian *rufula*. The s. t. line is accented by three or four preceding black points opposite the cell; the median space darker than the rest of the wing; the median lines and stigmata illegible; the reniform stained and blackish; claviform outlined. Lines marked by double costal streaks, with paler, inclosed shades. T. p. followed by minute points; fringe a little darker." * * * "Concolorous gray fuscous, smooth. Hind wings pale at base, with pale fringes and soiled veins. Beneath paler, gray, irrorate, with dark denticulate common line; suffused discal shade on fore wings and blackish discal point on hind wings." Expands 1.15 to 1.20 inches (29 to 30^{mm}).

HABITAT.—Arizona.

Mr. Grote compares the species to *rufula* and says it may prove a color variety. Three female specimens are before me, and have a somewhat different appearance from *rufula*, but without any marked character to distinguish them. Compared with Californian *rufula* they are darker, the t. a. line is more marked, and the reniform is more distinctly blackish, pale ringed. The claviform is not distinct in Mr. Grote's types, which are females. The male requires study to settle the question.

Taeniocampa oviduca Gn.

1, 357, 1852; Wlk. Cat. B. Mus. x, 429.

capsella Grt. Pr. Ac. 1874, 201. New List (? *oviduca* var).

Somewhat luteous red brown, often with a yellowish-gray suffusion. Median lines narrow, approximate, variably distinct, often subobsolete, sometimes narrow and pale, the defining lines wanting, or geminate with concolorous included space. T. a. evenly arquate, touching orbicular. T. p. outwardly bent over reniform, inwardly curved below that spot. A row of venular dots follows the t. p. line. S. t. line broad, pale, slightly sinuate; usually diffuse outwardly; inwardly limited by a slightly darker shade. Ordinary spots pale ringed, usually darker than ground color; orbicular rather large, and somewhat oblique. Secondaries sordid fusco-luteous. Beneath, powdery with a variably complete outer line; secondaries with a discal spot. Head and thorax concolorous. Harpes of male suddenly constricted, and slightly bent beyond middle, broadening into an obliquely rounded lappet which is spinulose at inner side. The clasper is double, or rather there are two projections forming the clasper. One is short, stout, somewhat beak-like, pointing downward; the other is longer, dilating toward tip, terminating in an acute point. Expands 1 to 1.20 inches (25 to 30^{mm}).

HABITAT.—Atlantic States to Florida, west to Mississippi.

Rather a variable species, yet easily known by the heavily bipectinate antennæ of the male, combined with the obtuse rather stumpy primaries. The vestiture is mixed scales and hair.

Taeniocampa utahensis Smith.

Proc. U. S. Nat. Mus. 1887, x, 473.

Luteous red brown, with blackish powderings. Median lines indistinct. T. a. very faint, outwardly arcuate. T. p. nearly parallel with outer margin, faintly geminate, the included space marked with pale scales. S. t. line obsolete, barely traceable by a few pale scales. A pale line at base of fringes. Terminal space darker shaded. Orbicular small, round, marked by a few pale scales. Reniform narrowly black marked, defined by a few pale scales superiorly; inferiorly black filled. Secondaries pale, fusco-luteous, outwardly darker. Beneath, powdery with an outer line, punctiform on secondaries; the latter also with a discal spot. The harpes of male are curved, gradually narrowing until dilated into the lappet-like tip, which is inwardly spinulose. Near the base is a long, slender, curved corneous process. Nearer to tip is a thick, more membraneous process, regularly tapering to a point. Expands 1.20 inches (30^{mm}).

HABITAT.—Utah.

A very distinct species. Its nearest ally is *oviduca*, from which it is readily distinguished by the shorter pectinations of the male antennæ, by the obsolete s. t. line, the small inconspicuous orbicular, and the inferiorly black filled reniform. The species was collected by Capt. D. H. Murdock, U. S. Army, near Fort Thornburgh, and I have never seen another specimen. The type is in the National Museum.

Taeniocampa incincta Morr.

Pr. B. S., N. H., 1874, xvii, 133, 156 (*Mamestra*); Grt. Buf. Bul. 2, 215, 1874; Can. Ent. 13, 126, 1881 (*Tæniocampa*).

Pale, reddish luteous, with black powderings. Median lines indistinct, geminate. T. a. slightly oblique, outwardly curved between veins. T. p. interrupted, nearly parallel with outer margin, outer line punctiform; the dots venular. S. t. line pale, but little sinuate, preceded by a series of sagittate black spots, longest opposite the cell. A narrow, pale terminal line. Orbicular moderate, concolorous, faintly outlined by a pale shade of ground color. Reniform upright, darker, faintly pale ringed. Secondaries pale fusco-luteous, darker outwardly, with a distinct discal lunule. Beneath, powdery; a variably distinct outer line; secondaries with a discal spot. Head and thorax concolorous. Harpes of male broad, curved, modified into the usual lappet-like tip, which is inwardly spinulose. A long, moderately stout, curved corneous hook near center of side piece. Near to tip is a thick, semi-membraneous, beak-like process. Expands 1.10 to 1.20 inches (28 to 30^{mm}).

HABITAT.—Massachusetts, Illinois (Morr.), Colorado.

The type from Professor Riley's collection bears a resemblance to *oviduca*; the Colorado specimens, which are unquestionably the same, have longer, more trigonate wings and less distinct maculation. The essential feature of the species is the prominent black shade composed of more or less distinctly sagittate spots, which precedes the s. t. line.

Tæniocampa suffusa Smith.

Proc. U. S. Nat. Mus. 1887, x, 474.

Pale, somewhat carneous gray, blackish powdered. Median lines indistinct. A short black basal streak. T. a. line blackish, traceable only for one-half its course, very oblique. Median space, with a rosy tint most distinct in the cell just beyond claviform. T. p. inconspicuous, nearly parallel with outer margin, marked rather by the paler s. t. space than otherwise. A darker shade on costa in s. t. space. S. t. line marked by the slightly darker terminal space, and further emphasized by a row of black spots *following* the line. An interrupted terminal black line. Fringes interlined. Claviform partly outlined in black. Ordinary spots large, pale, defined by black scales. Secondaries grayish white. Beneath very pale, hardly powdery, with indistinct outer line. Head and thorax concolorous, collar paler, with a darker line near tip. Harpes of male somewhat bent at middle, tip obliquely rounded, with a fringe of spinules at inner side. At middle is a broad, somewhat spoon-shaped corneous process, with an acute point; behind this is a more slender, cylindric, slightly curved hook, obtusely terminated. Expands 1.20 to 1.28 inches (30 to 32^{mm}).

HABITAT.—Colorado, Arizona.

A remarkable species, differing by the delicate tintings of gray and rosy red and by the presence of the claviform from all its allies. The wing form is that of *incincta*, from which this species is additionally separated by the dark shade following, instead of preceding, the s. t. line. The genitalia are very like those of *oviduca*.

Tæniocampa obtusa Smith.

Proc. U. S. Nat. Mus., 1887, x, 474.

Dark blackish gray, powdery, all the lines lost. The narrow claviform is fairly well defined by black scales, and is somewhat yellowish. The orbicular is also yellowish and fairly well defined, small. S. t.

line indicated by faint yellowish dots. A row of small, terminal black points. Secondaries white. Beneath, whitish gray, powdery along the costa and apices of all wings. Head and thorax concolorous. Harpes of male somewhat bent, the tip lappet like, obliquely rounded, inwardly spinulose. Near the base is a long, curved, moderately slender, tapering, corneous spur, behind which is a stout, short beak-like projection. Expands 1.10 inches (27^{mm}).

HABITAT.—Arizona.

A species peculiar by the short broad primaries, the outer margin oblique, and by the contrast in color between the two pairs of wings. The antennæ of the male are heavily bipectinate, the vestiture of front is rough, and the thoracic vestiture is scaly, dense, forming an indistinct median crest. The palpi are well developed and attain the vertex. The genitalia are like those of its near allies in character. It is a decidedly puzzling species. Mr. Graef has the male type, which is in fair condition except that it lacks the fringes.

Tæniocampa pectinata Smith.

Proc. U. S. Nat. Mus., 1887, x, 475.

Reddish luteous, densely irrorate with blackish powderings. Basal line faintly geminate; rather well marked. T. a. line obsolete. T. p. line rather close to outer margin; crenate, interrupted, outer portion of line punctiform. S. t. line very faintly paler, slightly sinuate. A row of more or less evident black spots just before outer margin. Reniform marked; upright, narrow, either paler or darker than ground color. Orbicular obsolete. Secondaries reddish gray; irrorate; a more or less evident discal spot. Beneath, reddish, powdery, with punctiform outer line and distinct discal spots. Head and thorax concolorous. Harpes of male bent, the lappet-like tip larger, oblique, inwardly spinulose. Clasper a rather long, curved, corneous hook; at base of this hook is a short, stout, beak-shaped process. Expands 1.35 to 1.50 inches (34 to 38^{mm}).

HABITAT.—California.

A large, robust species, with an appearance as though the wings were very thinly scaled. The very heavily pectinated and long antennæ are prominent. The vestiture is loose, long and hairy, forming indefinite tufts. Mr. Edwards has the type, which is somewhat battered but very recognizable.

In the Coll. U. S. Nat. Mus. are a number of fine specimens of this species collected by Mr. Koebele for Professor Riley, and by him donated to the Museum. They vary somewhat in ground color, and with good specimens at hand it is seen that there is a slight angulation at middle of outer margin of primaries, showing a close relationship to *Perigrapha.*

Tæniocampa terminata Smith.

Proc. U. S. Nat. Mus., 1887, x, 475.

Sordid yellowish gray, powdery; s. t. space somewhat darker, terminal space somewhat paler than the rest of wing. Median lines faintly marked, pale, interrupted. T. p. line followed by a row of black venular points which are outwardly limited by a pale dot. The s. t. line is defined by the strong contrast in shade between s. t. and terminal spaces; irregularly dentate. A row of distinct black spots close to outer margin, but not quite terminal. A wavy, pale, terminal line. A diffuse, dark median shade. Orbicular obsolete; reniform marked by a lunate yellow streak, apparently forming the outer margin of the spot. Secondaries blackish, with whitish fringes. Beneath whitish, powdery, with punctiform outer line and distinct discal spots. Head and thorax concolorous. Harpes of male equal to tip, where the superior angle is somewhat drawn out and the inferior angle rounded. Clasper corneous, moderately long, but slightly curved; at the base is another smaller hook, closely united with and apparently forming a part of the larger hook. Expands 1.60 inches (40^{mm}).

HABITAT.—Southern California.

The collar is somewhat produced centrally, there is an obvious though not prominent thoracic crest, and a truncate tuft on basal segment of abdomen. The species is therefore closely allied to *Perigrapha*, but has not the wing form of that genus, and the male antennæ are much more shortly pectinated. The type is a unique male in Mr. Tepper's collection.

Tæniocampa subfuscula Grt.

Pr. B. S. N. H. 16, 244, 1873 (*Anarta*), Buf. Bul. 2, pl. I, f. 7, 1874, *Anarta;* Smith, Proc. U. S. Nat. Mus., 1887, x, 474, *Tæniocampa.*

Ash gray, dark; powdery; median space more or less completely filled by a sordid blackish fuscous shade. Median lines distinct, black, single. T. a. line upright or outwardly oblique, irregularly curved and toothed on veins. T. p. line crenate, parallel with outer margin. Basal line distinct, geminate. S. t. line marked by a preceding irregular dusky shade, more or less interrupted. A row of black terminal spots. A pale line at base of fringes. Claviform rather small, but distinct, black marked; orbicular round, pale, sometimes with a central spot. Reniform upright, more or less obscured by the dusky shade; incompletely black ringed, and with rather a few white defining scales. Secondaries even, smoky fuscous. Beneath dull smoky gray, with variably complete outer line and distinct discal spot. Head and thorax concolorous. Harpes of male narrowing toward tip, which is oblique, with obtusely rounded angles; fringed inwardly with stout spinules. Toward base there is a curved corneous hook, moderate in length; half way to tip is a straight, somewhat flattened, process, broadening towards tip, where it is truncate. Expands 1.32 to 1.45 inches (33 to 36^{mm}).

HABITAT.—Oregon, Montana.

The thorax is quadrate, the vestiture somewhat flattened, leaving a somewhat prominent collar, and an indistinct basal tuft. The species has nothing in common with *Anarta*, to which Mr. Grote referred it, while it is somewhat aberrant placed here. Yet it agrees better with this genus than any other, and, until it finds closer allies, is better referred here.

Tæniocampa arthrolita Harr.

Buf. Bul. 2, 275, 1874 (*Graphiphora*).

Thorax and primaries are a light brownish drab, with a yellowish shade; the t. a. line is black but faint; the median shade more marked, most distinct just inside the reniform spot on the cell, making two angles, outwardly and inwardly; the t. p. line geminate, above rounded outwardly, below inwardly. The outer component line very distinct and waved; the s. t. and terminal lines a series of black dots; the reniform spot concolorous, with a pale annulus; the orbicular spot hardly perceptible. Beneath dusky, an arcuated line on both wings; a discal spot on the secondaries.

Expands 1.40 to 1.55 inches (34 to 38^{mm}).

HABITAT.—California.

Dr. Harvey's description is copied because the specimen before me, though certainly this species, is somewhat faded. The punctiform s. t. line will serve to at once distinguish the species. The male antennæ are said to be somewhat moniliform, the joints ciliate—my specimen is a female.

Tæniocampa pacifica Harv.

Buf. Bul., 2, 120, 1874 (*Graphiphora*); Grt., Can. Ent., 7, 45=*incerta;* Smith, Proc. U. S. Nat. Mus., 1887, x, 476, an sp. dist.

Obscure luteous gray, with black transverse striga and irroration, maculation obscure, median lines usually obsolete. T. p. line when present, with a defined angle opposite the reniform, then evenly oblique to hind margin. S. t. line concolorous or slightly paler, marked by a darker preceding shade, most evident on costa. A row of small terminal dots. Sometimes there is a distinct median shade parallel with the s. t. line. Orbicular usually obsolete, rarely pale ringed, always concolorous. Reniform large, pale ringed, usually darker, blackish. The secondaries are powdery, pale, with the discal spot of under side faintly reproduced. Beneath pale, powdery, an incomplete outer line and distinct discal spots on all wings. Head and thorax concolorous with primaries, the latter densely clothed with long hair. The harpes of the male narrow abruptly near tip, the inferior angle of tip produced into a rather long, curved process, acute at tip. The clasper is irregularly curved, somewhat dilated beyond the middle and rather obtusely terminated. A very distinct stout supplementary corneous process at base of clasper. Expands 1.40 to 1.60 (35 to 40^{mm}).

HABITAT.—Colorado, California.

This species has been referred as a variety of the eastern *alia*, but incorrectly. It closely resembles it in maculation, but has a more robust thorax and slightly different habitus. The genitalia are also different. More extended comparisons are made further on.

Tæniocampa alia Gn., 1, 354, 1852.

incerta Grt., Lists and Lit.; Dimmock,* Psyche, 1885, IV, 273; *instabilis* Fitch, Tr. N. Y. Agr. S., 16, 343 (*Orthodes*); Grt., Buf. Bul., 2, 23.
confluens Morr., Pr. B. S. N. H., 1874, 159; Grt., C. E., 12, 187 (*pr. syn.*).

Varies in ground color from pale luteous gray to dark grayish brown. Median lines obsolete or very faint; t. p. line usually punctiform. S. t. line irregular, pale, preceded by a darker shade. A row of black terminal dots. Ordinary spots large, pale ringed, reniform usually darker, at least inferiorly. Secondaries pale fuscous, powdery. Beneath powdery, with more or less complete common line and distinct discal spot. Head and thorax concolorous. The harpes of the male are suddenly narrowed and curved toward tip, which at its inferior angle is produced into a long, straight, acute process. The clasper is long, slender, regularly curved and acutely terminated. At the base there is an additional small, slender corneous process. Expands 1.40 to 1.60 inches (35 to 40^{mm}).

HABITAT.—Northern, Middle, and Eastern States; Missouri.

This species has been confounded with the European *incerta* (*instabilis*) and it closely resembles that species in maculation. It is perhaps possible to match specimens from both continents very closely, but the American form is distinguished by a different habitus, not easily definable, and also by the decidedly different genitalia. In the European form the harpe narrows gradually, and the tip is obliquely cut from each side, leaving the middle slightly projecting. The three species, *pacifica*, *alia*, and *incerta*, are very closely related, but are undoubtedly distinct. Compared with *pacifica*, *alia* is less robust, the thoracic clothing less dense, while the wings are apparently more heavily clothed with scales.

Mr. Morrison's species *confluens* is based on a specimen in which the ordinary spots are confluent, and the primaries have the costa more convex. The type is a female from Missouri and I have been unable quite to match it with a male, though specimens of *alia* with confluent spots are not rare. It is possible, but I think hardly probable, that a good species is covered by Mr. Morrison's name.

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*This species is among those found by Mrs. Dimmock on *Betula*.

Tæniocampa subterminata Smith.

Proc. U. S. Nat. Mus., 1887, x, p. 476.

Pale yellowish gray to deep brown red, varying to every possible intermediate shade. Median lines usually distinct, geminate, rarely obsolete. T. a. line outwardly oblique, waved. T. p. line nearly parallel with outer margin, very even; included space paler, outer part of line punctiform. S. t. line always very distinct, pale, outwardly shaded by some darker color than the rest of the wing, in dark specimens with black. Claviform large, concolorous, more or less completely outlined, always traceable. Ordinary spots large, pale ringed, usually concolorous, sometimes paler, rarely darker than ground color. An upright dark shade crosses the median space, beyond which the wing is usually darker to t. p. line. Secondaries as variable in shade as the primaries. Beneath, pale, powdery, with heavy dark outer line and large discal spot on all wings. Head and thorax concolorous with primaries. Harpes of male elongate, sides sinuate, subequal, tip oblique and inwardly spinulose. Toward the base are two corneous beak-like processes, arranged Y-shape, that form the clasper. Expands 1.4 to 1.6 inches (35 to 40^{mm}).

HABITAT.—Maine, New Hampshire, New York.

This very strongly marked species has been heretofore confounded with *alia*, from which it differs so strongly that it is surprising it has not been heretofore described. It is more common than *alia*, and is the form usually in collections as "*incerta*." An obvious difference is that in *alia* the s. t. line is *preceded*, while in the new species it is *followed* by a darker shade. The genitalia differ very markedly.

Tæniocampa garmani Grt.

Can. Ent. xi 23, 1879.

Deep dark brown, irrorate with black, terminal space paler. Median lines faint, pale. T. a. line regularly arcuate, t. p. sinuate. S. t. sinuate, marked by a black preceding shade. Ordinary spots subequal, slightly paler, somewhat indefinite. Secondaries yellowish fuscous, with obvious discal spot. Beneath, reddish luteous, powdery; discal spots distinct. Head and thorax concolorous. Harpes of male slightly curved, subequal, obtusely rounded at tip. Clasper a stout, curved, corneous hook of moderate length. Expands 1.5 inches (38^{mm}).

HABITAT.—Illinois, Iowa.

A robust species, very different from any of the others in this section, and readily distinguished.

Tæniocampa præses Grt.

Bull. Surv. 5, 202 (*Perigrapha*).

Dark blackish brown, with a carmine shade, powdered with black. Median lines very faint, slightly paler than ground color. S. t. line somewhat paler, preceded by a darker shade, its course slightly sinuate. Ordinary spots pale ringed; in the specimen before me confluent. Probably this is the exception and not the rule. Secondaries with a carmine tinge, blackish powdery, a distinct discal spot. Beneath powdery, with broad outer line and large discal spot. Head and thorax concolorous, collar paler, yellowish red. Harpes slightly curved, squarely cut off at tip, the angles somewhat prominent. The clasper is a curved, corneous hook of moderate length. Expands 1.40 inches (35^{mm}).

HABITAT.—California.

This species is readily recognized by the discolorous collar. It is closely allied to *garmani* and perfectly congeneric with it. The thorax has a small anterior crest, and there is a truncate posterior tuft, and these probably caused Mr. Grote to refer the species to *Perigrapha*. The same features to a less degree are visible in *garmani*, but neither have the heavily pectinate antennæ of *Perigrapha* nor its wing shape.

SPECIES UNKNOWN TO ME.

Tæniocampa agrotiformis Grote.

Can. Ent., XIII, 14, 1881, *Graphiphora*.

"*Female.*—This form reminds one of *Agrotis collaris* or *versipellis*. Eyes hairy, tibiæ unarmed, tuftings obsolete. Fore wing blackish brown to the continuous, black, upright, uneven subterminal line; beyond with the fringes brownish. Median lines geminate, faint. Orbicular round, paler than the wing. Reniform moderate, outwardly excavate, upright, pale ringed, with dark center. The cell between the spots black shaded. The stigmata are comparatively small. No trace of the claviform. Hind wings pale brownish fuscous, concolorous; fringes a little lighter and more reddish. Beneath secondaries paler, with discal dot and uneven exterior line; fore wings dark fuscuous to terminal space, which is pale with the fringes dark. Head and thorax like the fore wings; collar a little paler. Body rather slender; costa of primaries a little depressed centrally. Colorado, expands 34^{mm}. Differs from the described species quite strongly; from *Mamestra* by the untufted body parts."

Quite a distinct species from the description, and quite unlike anything I have seen. The type of ornamentation would seem to relate it with *garmani*.

Tæniocampa orobia Harv.

Can. Ent. VIII, 154, 1876 *Mamestra;* Grt., Can. Ent. XIII, 126, 1881, *Tæniocampa*.

"Eyes hairy; antennæ pectinate. Thorax and wings grayish fuscous, color of *trifolii;* basal half line white, t. a. line geminate, widely separated; t. p. line consisting of a series of white points; subterminal irregular, terminal line black. Orbicular spot large, white ringed with dark center; reniform constricted at the center, white margined with a dark filling. Subterminal space shaded light. Beneath of a lighter shade, discal spot and a faint trace of the t. p. line. Secondaries shining fuscous, fringes whitish, beneath lighter, discal spot black, very evident. Expanse 20^{mm}. Texas. (O. Meske.)"

"This species is allied to *trifolii*. The antennæ are pectinate, while in *trifolii* they are simple. In *orobia* the darker costal edge shows the white dots distinctly."

This is not now in the Meske collection. Mr. Grote referred it in 1881 to *Tæniocampa*, Harvey having described it as a *Mamestra*. The pectinated antennæ would seem to ally the species either to *rufula* or to *incincta*, according to the wing form, which is not described.

PERIGRAPHA Led.

Noct. Eur., 1857, 136.

A free translation of Lederer's description of the genus *Perigrapha* is as follows: "In habitus and the hairy eyes these insects resemble *Tæniocampa;* but the collar is excavated at the sides and joined at the middle in a sharp edge; the thorax is somewhat produced at the sides, and behind the collar there is a distinct crest. On the basal segment of abdomen there is a large truncate tuft of hair. Antennæ in both sexes pectinated, in the female the pectinations shorter. Primaries ash or brown gray, the usual spots unusually large, confluent, somewhat paler than ground color, deep black margined."

Except in one particular our species agree perfectly with the essential portions of this diagnosis, *i. e.*, in none of the species known to me are the antennæ in the female pectinated, but serrated in some. The character is an unusual one, and an important one for that reason; but, as otherwise, the species are so close to the European forms they had better be retained as congeneric—for the present, at least.

The head is strongly retracted, the palpi scarcely reaching or hardly exceeding the front. The body is robust, obtaining a somewhat clumsy appearance from the thick, rather loose, vestiture. The abdomen, compared with the large thorax, is small and short; little or not exceeding the hind angle of secondaries. In addition to the large truncate basal tuft, the males are furnished with smaller lateral tufts. The genitalia are various and separately described for each species. The primaries are proportionately rather long and wide, the apices acute, but slightly prolonged; outer margin obliquely rounded, leaving the middle somewhat prominent. The wing shape will serve to at once distinguish the genus.

Two well-marked groups are recognizable in our species; the first, and most typical, with the ordinary spots confluent. In this also the thoracic vestiture has scales and capitate hairs intermixed. The second, with the spots normal, separate and not unusually large. The thoracic vestiture is entirely hairy or at least with but a few capitate hairs intermixed.

Normalis heads the list in the first group, and is our largest species. It lacks all maculation save the pale, deep black ringed, ordinary spots, and is thus readily recognized. The genitalia are unique.

Inferior is a small species of a dull ash-gray color, densely irrorate with black scales; the ordinary spots are barely defined and hardly paler in ground color.

Plusiiformis is a handsome species, larger than the preceding and paler ash gray in color. The ordinary spots are distinctly outlined and the s. t. line is marked. In genital structure this species agrees in essential characters with *inferior* and *muricina*, the peculiar feature being a broad corneous plate, which at tip is emarginate, the projecting edges variably curved to form the clasper.

Muricina and *Behrensiana* differ from all the preceding by having the terminal space much paler than the other portions of the wing. The former is a pale, grayish brown, the lines obsolete or indistinct. The latter, which is unknown to me in nature, is said to be dark brown, coarsely irrorate with black, costal margin carneous, transverse lines distinct, pale.

The remaining species belong to the second group in which the ordinary spots are not confluent.

Pulchella is very readily recognized by the deep red-brown ground color, and the pale, blue gray terminal space. The transverse lines, so far as traceable, are also pale.

Erythrolita and *transparens* differ in not having the terminal space paler, or discolorous. The former is variable in ground color, and has the s. t. line well marked, though not continuous. *Transparens* is a dull red brown, with the s. t. line wanting and all ornamentation subobsolete.

Per. præses Grt. seems to me better referred as a *Tæniocampa*.

The species are Western and seem not common usually.

A more comprehensive division of the genus is as follows:

- Ordinary spots confluent, large, pale. Vestiture with scales or capitate hairs intermixed.
  - S. t. space concolorous.
    - Dark fuscous brown; all lines wanting; ordinary spots, pale ringed, black shaded. NORMALIS
    - Ash gray, dark, uniform, maculation obsolete........................INFERIOR
    - Paler, with a rufous tint; s. t. line marked, ordinary spots outlined. PLUSIIFORMIS
  - S. t. space paler.
    - Pale gray-brown; transverse lines obsolete..............................MURICINA
    - Dark brown, coarsely irrorate with black, costal margin carneous..BEHRENSIANA
- Ordinary spots normal, not confluent; vestiture hairy.
  - Terminal space discolorous, pale.
    - Deep red-brown; transverse lines and terminal space bluish gray....PULCHELLA
  - Terminal space concolorous.
    - Mouse-gray to leather-brown; s. t. line marked...................ERYTHROLITA
    - Dull red-brown. S. t. line obsolete..................................TRANSPARENS

Perigrapha normalis Grt.

Buf. Bul., 1873, 2, 162 (*Acerra*); List, 1875, pl. f. 4; C. E. 1879, 11, 27 (*Graphiphora*), *id.* 1881, 13, 133. (*Perigrapha.*)

Very even mouse-gray, transverse lines obsolete. Basal line faintly indicated. Ordinary spots confluent, very large, nearly equal in size and shape; superiorly open, else with a narrow whitish defining line, outwardly bounded by a blackish shade, which inferiorly shades into the ground color: the whole included in a very faint, pale V, which does not reach the inner margin. A row of small terminal dots, and a paler terminal line. Secondaries evenly fuscous. Beneath powdery fuscous, with a common darker line and discal spot. Head and thorax concolorous; collar slightly paler. The harpes of male are somewhat curved, and narrow regularly to tip, where they are acute. Clasper moderate in length, robust, not much curved, inwardly with an obtuse tooth. Expands 1.45 to 1.50 inches (35 to 37^{mm}).

HABITAT.—California.

This is an easily recognizable form. The lack of all maculation, except the large confluent ordinary spots, forms a distinctive feature.

Perigrapha inferior Smith.

Proc. U. S. Nat. Mus. 1887, x, 477.

Dark ash gray, all the maculation obsolete. Ordinary spots fused, slightly paler, but hardly defined. The primaries are crossed by fine brown strigæ, hardly visible except on close examination. Secondaries uniformly fuscous. Beneath powdery; secondaries with a large discal spot. Head and thorax concolorous with primaries; collar inferiorly with a reddish tint. The male genitalia are most nearly like *muricina*, but the inferior branch of clasper is very short, and acutely terminated. Expands 1.20 inches (30^{mm}).

HABITAT.—California.

Easily distinguished by the almost uniformly dark gray color, the fused ordinary spots scarcely paler. The male type is with Mr. Edwards.

Perigrapha plusiiformis H. Ed.

Pr. Cal. Ac. Sci., v. 267 (*Stretchia*); Grt. New List (*Perigrapha*).

Pale ash gray; ordinary spots slightly paler, confluent; the reniform with a rusty central shade. A short basal black dash. Basal line rather faint, but discernible. T. a. line fine, marked only above the middle. T. p. line punctiform. S. t. line even, narrow, pale, marked by preceding brown scales. Secondaries uniformly brown fuscous. Beneath, somewhat purplish with black irroration; a black discal spot on all wings. Head and thorax concolorous, tegulæ black-tipped, collar inferiorly purplish. Harpes of male broad, at tip truncate and bisinuate. Clasper as in *muricina.* Expands 1.28 inches (32^{mm}).

HABITAT.—Nevada.

Apparently a close relation of *muricina*, but at once separable by the concolorous terminal space. A single male specimen (the type) is in Mr. Edwards's collection.

Perigrapha muricina Grt.

Buf. Bul., 1875, 3, 85 (*Acerra*); C. E., 1879, 11, 27 (*Graphiphora*); *id.*, 1881, 13, 133 (*Perigrapha*).

Pale brown, with grayish suffusion in basal, s. t. and lower part of median space. Terminal space gray. Ordinary spots confluent in the form of a wide V; whitish gray, reniform with a rusty shade line; outline inferiorly and at sides, black. Basal line distinct, single, brown. A short brown basal dash. T. a. line narrow, single, outwardly curved between veins. T. p. line faint, slightly marked on veins, but hardly traceable except for the faint difference in shade between median and submedian space. S. t. space narrow, sharply defined outwardly by the even gray terminal space. S. t. line irregular, interrupted, brown; best marked at costa and internal margin where it bounds the pale terminal space. A row of slender brown terminal lunules. Secondaries even, fuscous. Beneath reddish, powdery, secondaries with extra discal line. Head and collar brown, the latter with darker tip. Tegulæ and tuftings gray, with brown tips. The harpes of male are slender, gradually enlarged into an obtuse lappet, which is inwardly sparsely spinulose. Clasper bifurcate, the inferior branch straight, stout, regularly tapering to tip; the superior branch curved, subequal. Expands 1.30 inches (33^{mm}).

HABITAT.—Oregon.

Readily distinguished by pale brown color, and the contrasting terminal space. The type is with Mr. Edwards.

Perigrapha Behrensiana Grt.

C. E., 1875, 7, 71 (*Graphiphora*), *id.* 1881, 13, 133 (*Perigrapha*).

" * * * The fore wings are coarsely irrorate with black, of a dull brown ground color, darker to the pale subterminal line, beyond which they are paler, with the veins pale marked. The costal edge is carneous. The lines are pale, tolerably approximate on internal margin, rather even, with blackish margins. The t. a. line outwardly oblique, the t. p. line flexuous. Ordinary spots large, pale margined, fused, so that there is a resemblance to some species of *Glaea.* Hind wings soiled white, sparsely irrorate, with a discal dot, concolorous fringes and a broken terminal line. Beneath whitish, a continuous line on primaries, dotted on hind wings; discal marks double on fore wings; very distinct on secondaries."

Expands 35 ^{mm}.

HABITAT.—California.

This species is unknown to me, but seems allied to ***muricina*** by the pale terminal space. The impression given by the description is that the ordinary spots are concolorous, which, with the distinct transverse lines, would separate this species from all others with confluent spots.

Perigrapha pulchella Harv.

C. E., 1876, 8, 54 (*Graphiphora*).

Deep red-brown; terminal space bluish gray. Superior portion of basal space, costa between ordinary spots, and a small patch at the inception of t. p. line also gray. T. a. line narrow, pale, upright. T. p. line unusually near to and nearly parallel with outer margin. Gray, with a preceding dusky shade, followed by a row of black venular dots which are outwardly shaded with gray. S. t. line marked only by the contrast between s. t. and terminal space. Ordinary spots slightly darker, narrowly pale lined, moderate in size. Secondaries uniformly fuscous. Beneath reddish, powdery with distinct common line and discal spots. Head and thorax of ground color. Expands 1.40 inches (34^{mm}).

HABITAT.—California.

A single female specimen. The type is in Mr. Edwards' collection. The species is a striking one, and not easily mistaken for anything else. The deep red-brown color and contrasting blue-gray terminal space are characteristic.

Perigrapha erythrolita Grt.

C. E., 1879, 11, 208 (*Graphiphora*); *id.* 1881, 13, 133 (*Perigrapha*).

Mouse-gray to a bright leather-brown; color very even. T. a. line obsolete; t. p. line obsolete, or marked by a geminate row of faint black dots. S. t. line interrupted, yellowish, preceded by a dark brown shade, its course oblique, even. Ordinary spots moderate, very narrowly pale ringed, slightly darker than ground color. Orbicular round, reniform rather narrow, upright. Secondaries smoky, outwardly darker. Beneath gray, powdery, with variably distinct outer line and discal dots. Head and thorax concolorous. The genitalia differ from all of the other species. The harpes are curved and bent, enlarged at tip and terminating in three lobes. The clasper is stout, curved and corneous, single. Expands 1.20 to 1.30 inches (30 to 35^{mm}).

HABITAT.—California.

This is a somewhat variable species in ground color, but readily recognizable always by the even oblique s. t. line, marked by an interrupted brown shade. The male genitalia are distinctive and differ from the other known forms.

Perigrapha transparens Grt.

Bull. Surv., 6, 583.

Even, rather deep red brown at base, with a carmine shade, maculation obsolete. The reniform is slightly darker and fairly well defined. The t. p. line is indicated by a geminate row of faint blackish dots. Secondaries fuscous. Beneath reddish, powdery; secondaries with a discal lunule. Head and thorax concolorous with primaries. Expands 1.50 inches (37^{mm}).

HABITAT.—Washington.

The female type is the only specimen I have seen. There need be no difficulty in identifying this very simply marked form, which seems thinly scaled, and is more powdery than usual, the atoms very fine and not apparent.

PLATE XXII.

1. Harpe and clasper of *Perigrapha normalis.*
2. Harpe and clasper of *Perigrapha inferior.*
3. Harpe and clasper of *Perigrapha plussiiformis.*
4. Harpe and clasper of *Perigrapha muricina.*
5. Harpe and clasper of *Perigrapha erythrolita.*
6. Harpe and clasper of *Orthodes infirma.*
7. Harpe and clasper of *Orthodes cynica.*
8. Harpe and clasper of *Orthodes enervis.*
9. Harpe and clasper of *Orthodes virgula.*
10. Harpe and clasper of *Orthodes irrorata.*
11. Harpe and clasper of *Orthodes puerilis.*
12. Harpe and clasper of *Himella intractata.*
13. Harpe and clasper of *Cocigrapha normalis.*
14. Harpe and clasper of *Ulolonche niveiguttata.*
15. Harpe and clasper of *Ulolonche fasciata.*
16. Harpe and clasper of *Ulolonche modesta.*
17. Harpe and clasper of *Scotogramma submarina.*
18. Harpe and clasper of *Trichoclea edwardsi.*

18*a*. Fore tibia and tarsal joints of *Trichoclea edwardsi.*

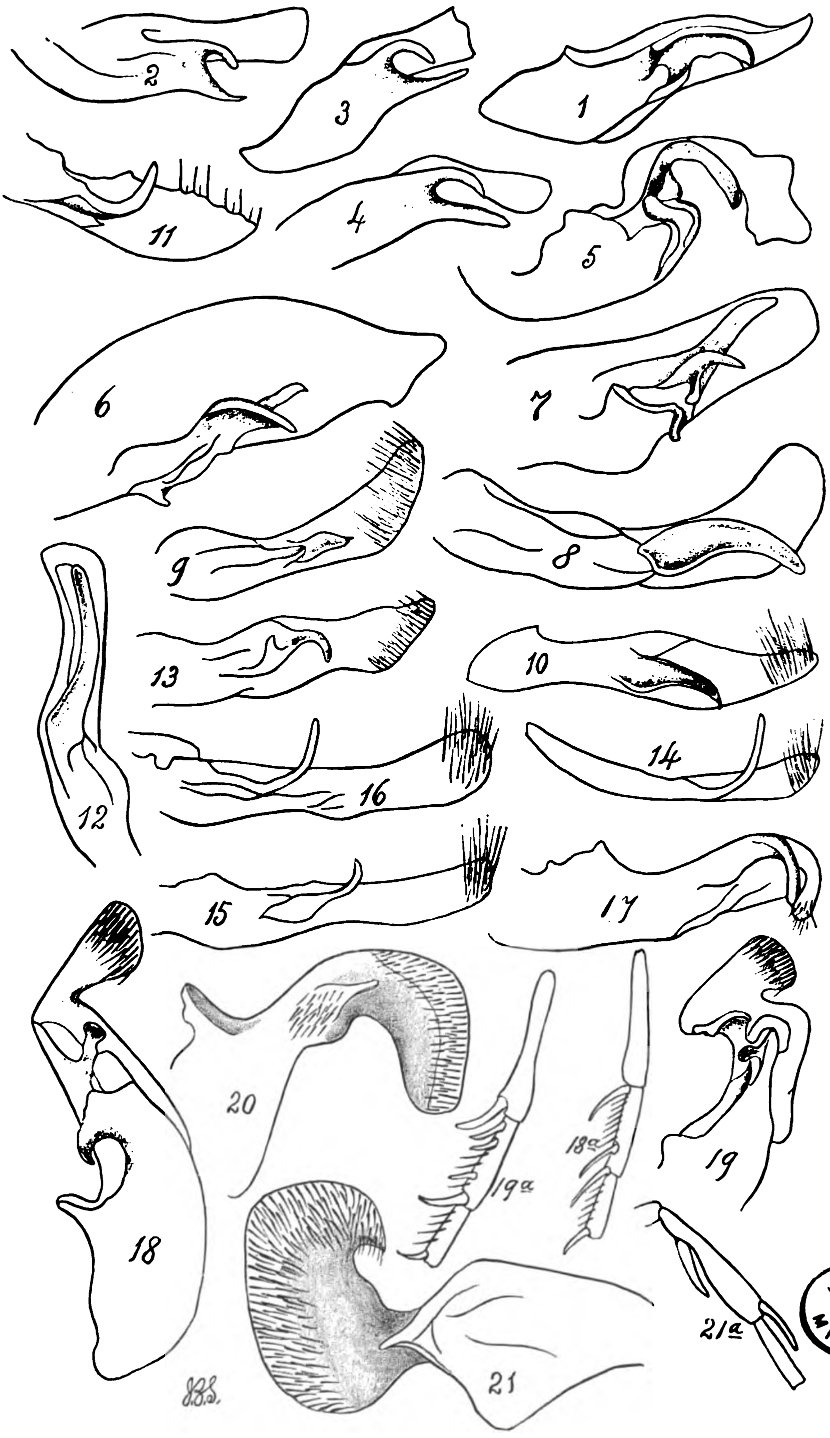
19*a*. Fore tibia and tarsal joints of *Trichoclea decepta.*

19. Harpe and clasper of *Trichoclea decepta.*
20. Harpe and clasper of *Barathra brassicæ.*
21. Harpe and clasper of *Barathra curialis.*

21*a*. Fore tibia of *Barathra curialis.*

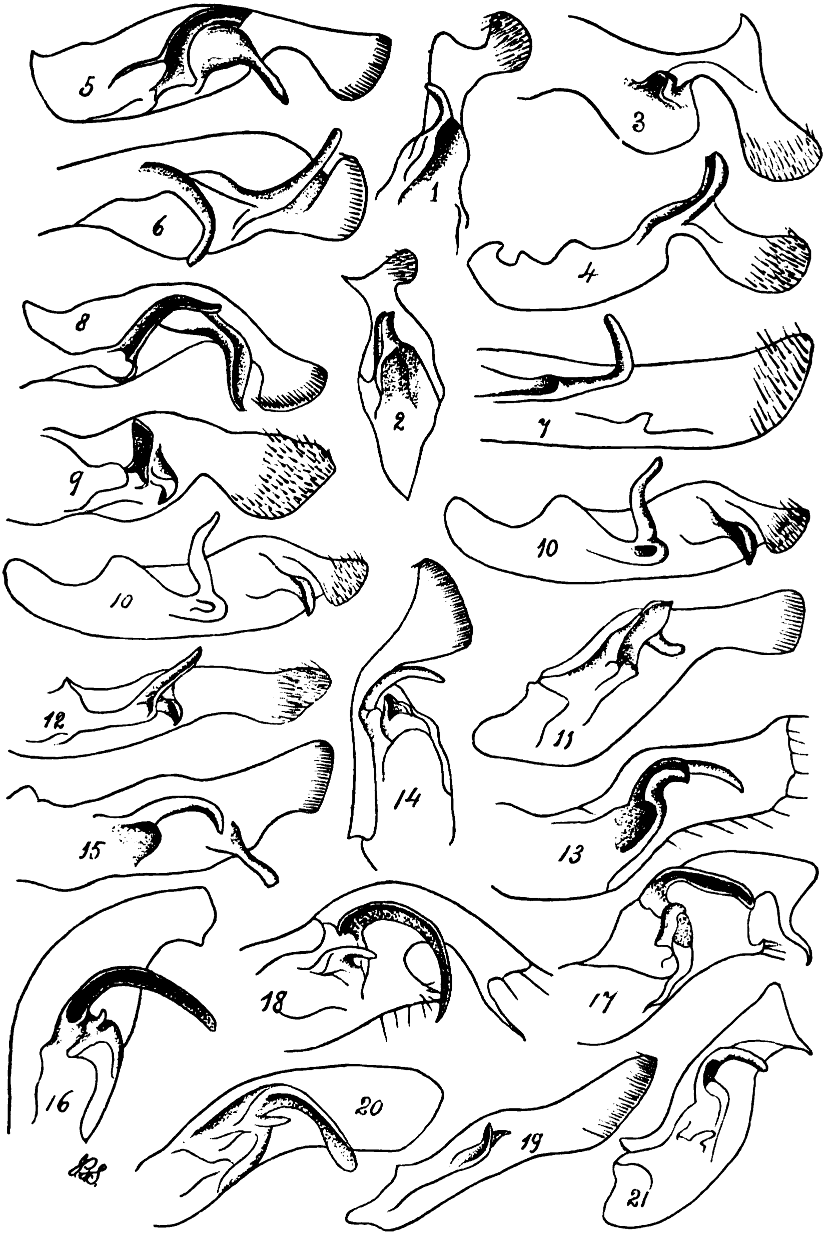
PLATE XXIII.

1. *Tæniocampa furfurata,* harpe and clasper.
2. *Tæniocampa perbrunnea,* harpe and clasper.
3. *Tæniocampa peredia,* harpe and clasper.
4. *Tæniocampa uniformis,* harpe and clasper.
5. *Tæniocampa columbia,* harpe and clasper.
6. *Tæniocampa rufula,* harpe and clasper.
7. *Tæniocampa modifica,* harpe and clasper.
8. *Tæniocampa utahensis,* harpe and clasper.
9. *Tæniocampa oviduca,* harpe and clasper.
10. *Tæniocampa incincta,* harpe and clasper.
11. *Tæniocampa suffusa,* harpe and clasper.
12. *Tæniocampa obtusa,* harpe and clasper.
13. *Tæniocampa terminalis,* harpe and clasper.
14. *Tæniocampa pectinata,* harpe and clasper.
15. *Tæniocampa subfuscula,* harpe and clasper.
16. *Tæniocampa incerta,* Hufn. (European) harpe and clasper.
17. *Tæniocampa pacifica,* harpe and clasper.
18. *Tæniocampa alia,* harpe and clasper.
19. *Tæniocampa subterminalis,* harpe and clasper.
20. *Tæniocampa garmani,* harpe and clasper.
21. *Tæniocampa præses,* harpe and clasper.



Genital Structure of the Tæniocampinæ.

UNIV. OF MICH.



Genital Structure of the Tæniocampinæ.

CATALOGUE OF THE DESCRIBED ARANEÆ OF TEMPERATE NORTH AMERICA.*

BY

DR. GEORGE MARX.

INTRODUCTION.

During the last few years I have prepared for my private use a card catalogue of the Araneæ of temperate North America as described by both American and European authors. I derive constantly so much benefit from this work that, with the thought that it will be equally useful for my colaborers in American arachnology, I herewith present it in the form of a catalogue.

In the arrangement of the families I have adopted Professor Thorell's new system as offered in his important work, "On Dr. Bertkau's Classification of the Order Araneæ" (Annals and Magazine of Natural History for April, 1886).

I have, however, made such changes in this arrangement as seemed necessary to me.

I first added to the suborder *Tetrapneumones* the tribus *Umbellitelariæ* for the family *Hypochilidæ*, for as *Hypochilus* possesses four distinct lamelar tracheæ or lungs, each provided with a separate stigma, it must be placed amongst the four-lunged spiders; but, as this genus (constituting at present alone the family *Hypochilidæ*) differs so widely in its morphological and anatomical characters from any *Tetrapneumonic* form, I found myself obliged to establish a separate tribus for this family—the *Umbellitelariæ*, a name suggested to me by Professor Thorell.

The next change I have made is to separate such primitive families as the *Filistatidæ* and *Dysderidæ* from the lowest tribus, the *Tubitelariæ* of the second suborder *Dipneumones*, and I have provided for these

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* Ever since the Department of Insects was established in the Museum the arachnological material has been referred to Dr. George Marx, who has become a recognized authority thereon. The following catalogue prepared by him is based, therefore, to some extent on Museum material, and I therefore recommend it for publication not only because it represents a great amount of careful labor, but because it is the first attempt to prepare a complete catalogue of the described Araneæ of North America, and will be invaluable to arachnologists.

C. V. RILEY,
Honorary Curator of Insects.

Proceedings National Museum. Vol. XII—No. 782.

families a new and separate tribus—the *Filitelariæ*; I have, however, added to it the family *Scytodidæ*, a family which by its characteristic features belongs rather to the lower types than to the so much higher developed group—the *Retitelariæ*. Professor Simon, in his "Arachn. de France," has already placed this family near the *Dysderidæ*.

I have further adopted, for the family *Pholcidæ*, Dahl's new tribus *Plagitelariæ*, and removed it from the *Retitelariæ* to near the preceding tribus, as the structural characters of this family, the weak extremities, and trophies, the peculiar form of the body, the arrangement of the eyes, and the peculiarly constructed male palpi, indicate in my opinion, a lower grade of development than that of the other Retitelarian families.

The American families treated in this catalogue now present the following scheme:

Order ARANEÆ.

Suborder I. TETRAPNEUMONES.

- I. Tribus TERRITELARIÆ.
  - Family Calommatidæ.
  - Family Theraphosidæ.
    - Subfamily Eriodontinæ.
    - Subfamily Theraphosinæ.
- II. Tribus UMBELLITELARIÆ.
  - Family Hypochilidæ.

Suborder II. DIPNEUMONES.

- III. Tribus FILITELARIÆ.
  - Family Filistatidæ.
  - Family Dysderidæ.
  - Family Scytodidæ.
- IV. Tribus PLAGITELARIÆ.
  - Family Pholcidæ.
- V. Tribus TUBITELARIÆ.
  - Family Drassidæ.
  - Family Dictynidæ.
  - Family Urocteidæ.
  - Family Clubionidæ.
  - Family Catadysidæ.
  - Family Agalenidæ.
  - Family Dinopidæ.
- VI. Tribus RETITELARIÆ.
  - Family Prodidomidæ.
  - Family Theridiidæ.
- VII. Tribus ORBITELARIÆ.
  - Family Epeiridæ.
  - Family Tetragnathidæ.
  - Family Uloboridæ.
- VIII. Tribus LATERIGRADÆ.
  - Family Thomisidæ.
    - Subfamily Thomisinæ.
    - Subfamily Philodrominæ.
  - Family Sparassidæ.
- IX. Tribus CITIGRADÆ.
  - Family Lycosidæ.
  - Family Oxyopidæ.
  - Family Podophthalmidæ.
- X. Tribus SALTIGRADÆ.
  - Family Attidæ.
    - Subfamily Attinæ.
    - Subfamily Lyssomaninæ.

NOTE.—The asterisk before a name signifies that this species has been described also from a foreign country. The reference notes are at the end of the catalogue.

Order ARANEÆ.

Suborder I TETRAPNEUMONES.

Tribus I TERRITELARIÆ.

Family CALOMMATIDÆ.

1869. Subfamily *Atypinæ* Thorell. On Europ. Spid., p. 164.
1871. Subfamily *Atypinæ* Ausserer. Beitr. z. K. d. Territel., pp. 123, 129.
1875. Subfamily *Atypinæ Id.* Zweiter Beitr. z. K. d. Territel., p. 132.
1878. *Atypidæ* Bertkau. Vers. e. nat. Anordn. d. Spid.; Archiv. f. Naturg., XLIV, I, p. 362.
1887. *Calommatoidæ* Thorell. Primo Saggio sui Ragni Birmani Ann. museo cir, Genoa, 1887-'88, p. 8.

ATYPUS.

Latreille. Nouv. Dict. d'Hist. Nat., XXIV, p. 133, 1804.

1805. *Oletera* Walck. Tabl. d. Aran., p. 7.
1832. *Atypus* Hentz. Am. Journ. Sc. and Art, XXI, p. 100.
1842. *Atypus Id.* Journ. Bost. Soc. Nat. Hist., IV, p. 223.
1861. *Atypus* Blackwell. Spid. of Gr. Brit., I, p. 14.
1869. *Atypus* Thorell. On Europ. Spid., p. 165.
1871. *Atypus* Ausserer. Beitr. z. Kenntn. d. Territel., pp. 125, 131.
1875. *Atypus Id.* Zweiter Beitr. z. K. d. Territel., pp. 133, 139.
1875. *Atypus* Hentz. Spid. of the U. S., ed. by Burgess, p. 19.

A. bicolor Lucas. Quelques observ. s. l. genre Atypus. Ann. Soc. Ent. France, V. p. 216, pl. 5, fig. 5.

A. niger Hentz. Journ. Bost. Soc. Nat. Hist. IV, p. 224. *Id.* Sp. U. S., ed., Burgess, p. 19, pl. 2, fig. 1. Mass. Md. D. C. Va.

Family THERAPHOSIDÆ.

1817. *Territeles* Latr. Cuvier's Règne Anim. III, p. 79.
1823. *Terrestres* Sund. Gen. Aran. suec., p. 10.
1825. *Tetrapneumones* Latr. Fam. Nat. du Règne Anim., p. 312.
1830. *Theraphosæ* Sund. Svensk. Spindl. beskr.
1869. *Theraphosoidæ* Thorell. On Europ. Spid., p. 161.
1871. *Theraphosoidæ* Ausserer. Beitr. z. K. d. Territel. Eriodontinæ Theraphosinæ.
1875. *Theraphosoidæ Id.* Zweiter Beitr. z. K. d. Territel.

Subfamily ERIODONTINÆ.

1871. Ausserer. Beitr. z. Kenntn. d. Territel., p. 134.

ANTRODIÆTUS.

Ausserer. Beitr. z. Kenntn. d. Territel., p. 136. 1871.

1875. Ausserer. Zweiter Beitr. z. Kenntn. d. Territel., p. 133.

A. unicolor Hentz (*Mygale*) Journ. Bost. Soc. Nat. Hist., IV, p. 56. *Id.* Spid. U. S., ed., Burgess, p. 18, pl. 1, fig. 5. Ala.

——— Ausserer. Beitr. z. Kenntn. d. Territel., p. 136.

Subfamily THERAPHOSINÆ.

1869. Thorell. On Europ. Spid., p. 164.
1871. Ausserer. Beitr. z. Kenntn. d. Territel., p. 136.

PACHYLOSCELIS.

Lucas. Sur un nouv. genre. Ann. Soc. Ent. France, III, p. 361. 1833, ad part.

1833. *Cratoscelis* Lucas *ibid.*
1837. *Sphodros* Walck. Ins. Apt. I, p. 247 ad part.
1837. *Actinopus* Lucas. Observat. s. l. Aran. Ann. Soc. Ent. France, VI, p. 369,
1842. *Sphodros* Walck. Ins. Apt. II, p. 437.
1864. *Sphodros* Simon. Hist. Nat. d'Araign., p. 89 ad part.
1871. *Pachyloscelis* Ausserer. Beitr. z. K. d. Territel., pp. 125, 138.
1875. *Pachyloscelis Id.* Zweiter Beitr. z. K. d. Territel., p. 133.

P. rufipes Lucas. Sur un nouv. genre, etc. Ann. Soc. Ent. France, III, p. 361. Philad'a.
——— Ausserer. Beitr. z. K. d. Territel., p. 139.
Cratoscelis rufipes Luc. Ann. Soc. Ent. France, III, p. 361, pl. 7, fig. 1.
Sphodros lucasi Walck. Ins. Apt., I, p. 250.
Actinopus rufipes Luc. Ann. Soc. Ent. France, VI, p. 376.

ACTINOPUS.

Perty. Delect. anim., etc., p. 198. 1834.

1833. *Pachyloscelis* Lucas. Ann. Soc. Ent. France, III, p. 361 ad part.
1837. *Sphodros* Walck. Ins. Apt., I, p. 250 ad part.
1837. *Actinopus* Lucas. Observ. s. l. Aran. Ann. Soc. Ent. France, VI, p. 377.
1864. *Sphodros* Simon. Hist. Nat. d'Araign., p. 89 ad part.
1871. *Actinopus* Ausserer. Beitr. z. K. d. Territel., pp. 126, 140.

A. pertyi Lucas. Ann. Soc. Ent. France, VI, p. 377.

CHLOSTEROCHILUS.

Ausserer. Beitr. z. Kenntn. d. Territel., pp. 125, 141. 1871.

1875. Ausserer. Zweit. Beitr. z. Kenntn. d. Territel., pp. 130, 131, 134.
1833. *Pachyloscelis* Lucas. Ann. Soc. Ent. France, III, p. 361 ad part.
1837. *Sphodros* Walck. Ins. Apt., I, p. 247 ad part.
1841. *Mygale* Hentz. Journ. Bost. Soc. Nat. Hist., IV, p. 56 ad part.
1864. *Sphodros* Simon. Hist. Nat. d'Araign., p. 89 ad part.

C. gracilis Hentz (*Mygale*). Journ. Bost. Soc. Nat. Hist., IV, p. 56. *Id.*, Sp. U. S. ed. Burgess, p. 17, pl. I, fig. 4. Ala.
——— Ausserer. Beitr. z. Kenntn. d. Territel., p. 142.

THERAGRETES.

Ausserer. Beitr. z. Kenntn. d. Territel., p. 142. 1871.

1837. *Sphodros* Walck. Ins. Apt., I, p. 247 ad part.
1837. *Actinopus* Lucas. Ann. Soc. Ent. France, VI, p. 377 ad part.
1864. *Sphodros* Simon. Hist. Nat. d'Araign., p. 89 ad part.

T. walkenærii Lucas (*Actinopus*). Ann. Soc. Ent. France, VI, p. 377. Ga.
Sphodros abbotii ♂ Walck. Abbot Ga. Sp. Ins. Apt. I, p. 247.

MADOGNATHA.

Ausserer. Beitr. z. Kenntn. d. Territel., p. 143. 1871.

1837. *Sphodros* Walck. Ins. Apt. I, p. 247 ad part.
1837. *Actinopus* Lucas. Ann. Soc. Ent. France, VI, p. 377 ad part.
1864. *Sphodros* Simon. Hist. Nat. d'Araign., p. 89 ad part.

M. abbotii Walck. (*Sphodros*) ♀ Abbot Ga. Sp. Ins. Apt., I, p. 247.
Sphodros Milbertii ♂ Walck. *Ibid.*, p. 249.
Actinopus Abbotii Lucas. Ann. Soc. Ent. France, VI, p. 377. (Here did Lucas show that *Sphodros milbertii* Walck. ♂ was the male of *Sphodros Abbotii* and that *Sphodros Abbotii* Walck. ♂ belonged to a different species, which he named *Actinopus walkenærii*.)

CYCLOCOSMIA.

Ausserer. Beitr. z. Kenntn. d. Territel., p. 144. 1871.

1841. *Mygale* Hentz. Journ. Bost. Soc. Nat. His., IV, p. 55, ad part.

C. truncata Hentz (*Mygale*). Journ. Bost. Soc. Nat. Hist., IV, p. 55. *Id.*, Sp. U. S., ed. Burgess, p. 16, pl. I, fig. 1, Ala.

PACHYLOMERUS.

Ausserer. Beitr. z. K. d. Territel., p. 145. 1871.

1886. Atkinson. Entom. Americana, II, p. 133.

P. carabivorus Atkinson. Entom. Americana, II, p. 133, pl. V, figs. 1, 4, 20, N. C.,
——— *Id.* Am. Naturalist, XX, p. 583, pl. 23, fig, 1–7; pl. 24, fig. 1–8.
P. carolinensis Hentz (*Mygale*). Journ. Bost. Soc. Nat. Hist., IV, p. 56. *Id.*, Sp. U. S., ed. Burgess, p. 17, pl. I, fig. 3, N. C., Ala., D. C., Va.
——— Ausserer. Beitr. z. K. d. Territel., p. 147.
——— Atkinson. Entom. Americana, II, p. 135, pl. 5, fig. 2, 3, 20.
Mygale solticialis ♂ of *carolinensis*, Hentz. Journ. Bost. Soc. Nat. Hist., IV, p. 56. *Id.*, Sp. U. S., ed. Burgess, p. 17, pl. 1, fig. 2.
Pachylomerus solsticialis (note 1) Ausserer. Beitr. z. K. d. Territel., p. 147.
Pachylomerus solsticialis Atkinson. Entom. Americana, II, p. 135.
P. emarginatus Atkinson. *Ibid.*, p. 134. (A variety of *carabivorus*, N. C.)
P. quadrispinosus Atkinson. *Ibid.*, p. 136, N. C.
P. solstitialis Hentz (*Mygale*), ♂ of *carolinensis*.
P. turris Atkinson. Entom. Americana, II, p. 92, pl. 4, fig. 15, 16, N. C.
——— *Id.* *Ibid.*, p. 109.
——— *Id.* *Ibid.*, p. 136, pl. 5, fig. 5.

NIDIVALVATA.

Atkinson. Entom. Americana, II, p. 129.

N. angustata Atkinson. *Ibid.*, p. 130, N. C.
N. marxii Atkinson. *Ibid.*, pp. 111–116, 130, pl. 5, fig. 8, 9, 10, 13, 23, N. C.

MYRMEKIAPHILA.

Atkinson. Entom. Americana, II, p. 131.

M. foliata Atkinson. *Ibid.*, pp. 113, 116, 131, N. C.

CTENIZA.

Latreille. Hist. Nat. du Règne animal, p. 315. 1825.

1825. *Mygale* Walck. Faune Franc. Aran., p. 4.
1829. *Cteniza* Latr. Cuvier's Règne animal, ed. IV, p. 230.
1840. *Actinopus* Westwood. On Trapdoor Spid., p. 175.
1864. *Mygalodonta* Simon. Hist. Nat. d'Araign., p. 75.
1869. *Nemesia* Thorell. On Europ. Spid., p. 166.
1871. *Cteniza* Ausserer. Beitr. z. K. d. Territel., p. 151.
1875. *Cteniza Id.* Zweiter Beitr. z. K. d. Territel., pp. 130, 131, 134.

C. **californica** Cambridge. Specific. descr., etc., p. 260–264, pl. 15, fig. B. California.
——— Ausserer. Zweiter Beitr. z. K. d. Territel., p. 148.

EURYPELMA.

C. Koch. Uebers. d. Arachn., Systems V, p. 73. 1850.

1850. *Lasiodora* C. Koch. *Ibid.*, p. 72.
1869. *Avicularia* Thorell. On Europ. Spid., p. 168.
1871. *Eurypelma* Ausserer. Beitr. z. K. d. Territel., p. 208.

E. **californica** Doleschall (*Theraphosa*). MSS., p. 8. California.
——— Ausserer. Beitr. z. K. d. Territel., p. 214.
E. **hentzii** Girard (*Mygale*). Marcy's Expl. of the Red Riv. of La., 1852, p. 251, pl. 16, fig. 1–3, La., Tex., Kans.
——— Cragin. Contrib. to Knowl. of Arachn. of Kansas. Bull. Washburn Coll., I, No. 4, p. 145.
E. **leiogaster** Doleschall (*Theraphosa*). MSS., p. 14. California.
——— Ausserer. Beitr. z. K. d. Territel., p. 214.
E. **mordax** Ausserer. Beitr. z. K. d. Territel., p. 211. Texas.
E. **rileyi** Marx. Proceed. Entom. Soc. Washington, I, p. 116. California.
E. **steindachnerii** Ausserer. Zweiter Beitr. z. K. d. Territel., p. 199, pl. 7, figs. 43, 44. N. Mex.

BRACHYBOTHRIUM.

Simon. Bull. Soc. Zool., IX, p. 313. 1884.

B. **accentuatum** Simon. *Ibid.*, (p. 3). N. C.
B. **pacificum** Simon. *Ibid.*, p. 313; p. 2, Wash.

HEXURA.

Simon. Bull. Soc. Zool., IX, p. 316. 1884.

H. **picea** Simon. *Ibid.*, p. 3. Wash.

ATYPOIDES.

Cambridge. Proceed. Lond. Zool. Soc., p. 354. 1883.

A. **riversii** Cambridge. *Ibid.*, p. 355, pl. 36, fig. 2. California.

Mygale Walck (Note 2).

M. carolinensis Hentz = *Pachylomerus carolinensis.*
M. **fluviatilis** Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 286. *Id.*, Sp. U. S., ed. Burgess, p. 159, pl. 17, fig. 15. Ala.
M. gracilis Hentz = *Chlosterochilus gracilis.*

M. notasiana Walck. Ins. Apt., I, p. 230. Port Jackson, Louisiana.
Mygale inedite de la Nouv. Orleans. Latreille Nouv. Dict. d'Hist. Nat., XXIV, p. 133.

M. solstitialis Hentz = ♂ of *Pachylomerus carolinensis.*
M. truncata Hentz = *Cyclocosmia truncata.*
M. unicolor Hentz = *Antrodiætus unicolor.*

Tribus II UMBELLITELARIÆ.

Family HYPOCHILIDÆ.

Marx. Entomologica Americana, IV, p. 160. 1888.

HYPOCHILUS.

Marx. Entom. Americ., IV, p. 160. 1888.

H. thorellii Marx. *Ibid.*, p. 160, pl. 1, fig. 1–13. Tenn., Ga.

Suborder II DIPNEUMONES.

Tribus III FILITELARIÆ.

Family FILISTATIDÆ.

1867. Ausserer. Die Arachn. Tirols, I, p. 140.
1869. Thorell. On Europ. Spiders, p. 158.

FILISTATA.

Latreille. Consid. gén. sur les Crust., les Arachn. et les Ins., p. 121. 1810.

1832. Hentz. Am. Journ. of Science and Art, XXI, p. 101.
1839. *Teratodes* C. Koch. Die Arachn., V, p. 6.
1842. *Filistata* Hentz. Journ. Bost. Soc. Nat. Hist., IV, p. 226.
1869. *Filistata* Thorell. On Europ. Spid., p. 160.
1875. *Filistata* Hentz. Spid. U. S., ed. by Burgess, p. 22.

F. capitata Hentz. Journ. Bost. Soc. Nat. Hist., IV, p. 228. *Id.*, Sp. U. S., ed. Burgess, p. 24, pl. 2, fig. 7.
——— Keyserling N. Sp. a. Am. I Verh. d. z. bot. Ges. Wien, 1879, p. 345 (55), pl. 4, fig. 33.
Theratodes depressus C. Koch Die Arachn., IX, p. 103, fig. 755.

F. hibernalis Hentz. Journ. Bost. Soc. Nat. Hist., IV, p. 227. *Id.*, Sp. U. S., ed. Burgess, p. 23, pl. 2, fig. 6.
——— Keyserling. N. Sp. a. Am. I Verh. d. z. b. Ges. Wien, 1879, p. 348 (58).

Family DYSDERIDÆ.

1837. *Dysderides* C. Koch. Uebers. d. Arachn., Syst. 1, p. 20.
1869. *Dysderoidæ* Thorell. On Europ. Spid., p. 152.
1890. *Dysderidæ* Emerton. Trans. Conn., ac. VIII., p. 36.

DYSDERA.

Latreille. Nouv. Dict. d'Hist. Nat., XXIV, p. 134. 1804.

1832. Hentz. Am. Journ. Sc. and Art, XXI, p. 101.
1837. Walck. Ins. Apt. I, p. 261 (les Agones).
1842. Hentz. Journ. Bost. Soc. Nat. Hist., IV, p. 224.
1869. Thorell. On Europ. Spid., p. 157.
1875. Hentz. Sp. U. S., ed. Burgess, p. 20.

***D. crocata** C. Koch. Die Arachn., V, p. 81, figs. 392–394, Mass., Md., D. C., Va.
Interrita Hentz. Journ. Bost. Soc. Nat. Hist., IV, p. 224; *Id.*, Sp. U. S., ed. Burgess, p. 20, pl. 2, fig. 1.
——— Emerton. N. Engl. Drass., Agal. and Dysd. Trans. Conn., Ac. VIII, 1890, p. 36, pl. 8, fig. 2. Mass.
D. interrita Hentz = *crocata.*

ARIADNE.

Sav. et Aud. Descr. de l'Égypte, ed. 2, XXII, p. 308. 1825–'27.

1869. Thorell. On Europ. Spid., p. 155.
1842. *Pylarus* Hentz. Journ. Bos. Soc. Nat. Hist., IV. p. 225.
1875. *Pylarus Id.* Sp. U. S., ed. by Burgess, p. 20.

A. bicolor Hentz (*Pylarus*). Journ. Bost. Soc. Nat. Hist., IV, p. 225; *Id.*, Spid. U. S., ed. Burgess, p. 21, pl. 2, fig. 3. Ala., Fla., Ohio, Va., D. C., Md., Pa., R. I. Mass.
——— Emerton. N. Engl. Drass., Agal. and Dysd. Trans. Conn., Ac. VIII, 1890, p. 37, pl. 8, fig. 3. Mass., Conn., L. Isl.
A. pumilis Hentz (*Pylarus*). *Ibid.*, p. 226; *Id.*, *ibid.*, p. 22, pl. 2, fig. 5. N. C., Ala.

Family SCYTODIDÆ.

1864. *Scytodiformis* Simon. Hist. Nat. d'Araign., p. 43.
1864. *Scytodidæ* Blackw. Spid. of Gr. Brit. II, p. 379.
1869. *Scytodoidæ* Thorell. On Europ. Spid., p. 103, *ad part.*
1877. *Scytodoidæ* Keyserling. Verh. d. z. b. Ges. Wien, p. 205.
1884. *Scytodinæ* Emerton. N. Engl. Terid., Trans. Conn. Ac., VI, p. 31 *ad part.*

SCYTODES.

Latreille. Nouv. Diction. d'Hist. Nat., XXIV, p. 134 ad part. 1804.

1869. Thorell. On Europ. Spid., p. 103.
S. cameratus = *thoracica.*

***S. thoracica** Latr. (Aranea). Tabl. Meth. d. Ins. in Nouv. d'Hist. Nat., XXIV, p. 134. Mass., Ala., D. C.
——— Thorell. On Europ. Spid., p. 103.
——— Emerton. N. Engl. Therid., Trans. Conn. Ac., VI, p. 31, pl. 6, fig. 4.
cameratus Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 35; *Id.*, Spid. U. S., ed. Burgess, p. 141, pl. 15, fig. 17.

LOXOSCELES.

Hein & Lowe. Desc. of two sp. of Aran., Zool. Journ., v, p. 321, 1831.

1833. *Omosites* Walck. Mem. s. une nouv. Classif. d'Aran., p. 438.
1837. *Scytodes* Walck. Ins. Apt., I, p. 270 ad part; two Fam. (*les Deprimées*).
1864. *Omosita.* Simon Hist. Nat. d'Araign., p. 50.

L. rufescens Dufour. Descr. de ving Arachn. Ann. General d. Science Phys., IV, p. 204. Fla.

L. unicolor Keyserling. N. Spid. a. Am., VII, Verh. d. z. b. Ges. Wien, 1887, p. 474, pl. 6, fig. 46. N. Mex.

Tribus IV PLAGITELARIÆ.

Family PHOLCIDÆ.

1850. *Pholcides* C. Koch. Uebers d. Arachn., Syst. V, p. 31.
1864. *Phalangoidiens* Simon. Hist. Nat. d'Araignées, p. 43.
1869. *Pholcinæ* (subfam.) Thorell. On Europ. Spid., p. 101.
1874. *Pholcidæ* Simon. Arachn. de France, I, p. 254.
1884. *Scytodinæ* Emerton. N. Engl. Therid. Trans. Conn. Ac., VI (*ad partem*), p. 30.

PHOLCUS.

Walck. Tabl. d'Aran., p. 80 (ad part.), 1805.

1832. Hentz. Am. Journ. Sc. and Arts, XXI, p. 103.
1850. *Id.* Journ. Bost. Soc. Nat. Hist., VI, p. 284.
1875. *Id.* Spid. of the U. S., ed. by Burgess, p. 157.
1884. Emerton. N. Engl. Therid., Trans. Conn. Ac., VI, p. 30.

P. atlanticus Hentz = *phalangioides.*

P. cornutus Keyserling. N. Sp. a. m., VII. Verh. d. z. b. Ges. Wien, 1887, p. 475, pl. 6, fig. 47. D. C.

P. gibbosus Keyserling. Amerik. Pholc., Scytod, and Dysderid. Verh. d. z. b. Ges. Wien, 1877, p. 208. Ariz.

***P. phalangioides** Fuessl. (*Aranea*). Verz. d. Schweizer Insekten, 1775. U. S.
——— Blackw. Spid. fr. Canada. Ann. and Mag. of Nat. Hist., XVII, p. 77. Canada.
——— Emerton. N. Engl. Therid., Trans. Conn. Ac., VI, p. 30, pl. 6, fig. 2.
atlanticus Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 284. *Id.*, Sp. U. S., ed. Burgess, p. 157, pl. 17, fig. 7.

P. pullulus Hentz (*Theridium*). Journ. Bost. Soc. Nat. Hist., VI, p. 282. *Id.*, Sp. U. S., ed. Burgess, p. 155, pl. 17, fig. 5. Ala., Colo., D. C.
——— Thorell. Arachn. Coll. in Colorado, Bull. U. S. Geol. Surv. Terr., III, No. 2, p. 487

SPERMOPHORA.

Hentz. Am. Journ. of Sc. and Arts, XLI, p. 116. 1841.

1869. Thorell. On European Spiders, p. 102.
1850. *Oophora* Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 285.

S. meridionalis Hentz. Am. Journ. of Sciences and Arts, XLI, p. 116. Ala., D. C. Conn., Mass.
——— Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 31, pl. 6, fig. 3.
Oophora meridionalis Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 285. *Id.*, Sp. U. S., ed. Burgess, p. 159, pl. 17, fig. 9.

Tribus V TUBITELARIÆ.

Family DRASSIDÆ.

1833. *Drassides* Sundev. Conspect. Arachn., p. 17 *ad part.*
1864. *Drassiformis* Simon. Hist. Nat. d'Araign.
1866. *Drassidæ* L. Koch. Die Arachn. fam. d. Drassiden.
1869. *Drassoidæ* Thorell. On Europ. Spid., p. 137.
1878. *Drassidæ* Simon. Arachn. de France, IV, p. 1.
1890. *Drassidæ* Emerton. Trans. Conn. Ac. VIII, p. 1.

MICARIA.

Westring. Foerteckn., etc., p. 46. 1851.

1832. *Herpyllus* Hentz. Am. Journ. Sc. and Arts, p. 102 *ad part.*
1861. *Micaria* Westring. Aran. Suecic., p. 330.
1864. *Micaria* Simon. Hist. Nat. d'Araign., p. 112.
1866. *Micaria* L. Koch. Draissiden, pp. 2, 52.
1869. *Micaria* Thorell. On Europ. Spid., p. 146.
1878. *Micaria* Simon. Arachn. de France, IV, p. 5.

M. aurata Hentz (*Herpyllus*). Journ. Bost. Soc. Nat. Hist., V, p. 459; *Id.*, Spid. U. S., ed. Burgess, p. 96, pl. II, fig. 15, Ala., Fla., La. Tex.
M. longipes Emerton. N. Engl. Drass., Agal. and Dysd. Trans. Conn. Ac., VIII, 1890, p. 3, pl. 3, fig. 1. Mass.
M. montana Emerton. *Ibid.*, p. 4, pl. 3, fig. 2. New Hampshire.

DRASSUS.

Walck. Tabl. d'Aran., p. 45. 1805.

1832. *Herpyllus* Hentz. Am. Journ. Sc. and Arts, p. 102 *ad part.*
1861. *Drassus* Blackw. Spid. Gr. Brit., I, p. 104 ad part.
1866. *Drassus* L. Koch. Drassiden, pp. 2, 76.
1869. *Drassus* Thorell. On Europ. Spid., p. 147.
1878. *Drassus* Simon. Arachn. de France, IV, p. 101.
1890. *Drassus* Emerton. Trans. Conn. Ac., VIII, p. 14.

D. capulatus Walck. Abbot Ga. Spid. Ins. Apt., I, p. 621. Ga.
D. coloradensis Emerton. Append. to Thorell's Descr. of Aran. coll. in Col.; Bull. U. S. Geol. Surv. Terr., III, No. 2, p. 528. Colo.
D. diversus Blackw. Spid. fr. Montreal, Ann. and Mag. Nat. Hist., VIII, p. 429. Canada.
D. hunterae Blackw. *Ibid.*, p. 429. Canada.
D. neclectus Keyserling. N. Spid. a. Am., VII; Verh. d. z. b. Ges. Wein, 1887, p. 434. N. America.
D. nocturnus Walck. Ins. Apt., I, p. 615. Canada.
——— Blackw. Spid. from Canada; Ann. and Mag. Nat. Hist., XVII, p. 41.
D. robustus Emerton. N. Engl. Drass., Agal. and Dysd. Trans. Conn. Ac., VIII, 1890, p. 15, pl. 4, fig. 4. Mass.
D. saccatus Emerton. *Ibid.*, p. 14, pl. 4, fig. 7.
D. ocellatus Walck. Abbot Ga. Sp.; Ins. Apt., I, p. 621. Ga.
D. vasifer Walck. Abbot Ga. Sp.; Ins. Apt., II, p. 620. Carolina.
——— Blackw. Spiders from Canada. Ann. and Mag. Nat. Hist., XVII, 1846, p. 41. Canada.
——— Blackw. Spiders from Montreal. *Ibid.*, VIII, 1871, p. 429. Canada.

TEMINIUS.

Keyserling. N. Sp. a. Am., VII. Verh. d. z. b. Ges. Wien, p. 421. 1887.

T. continentalis Keyserling. *Ibid.*, p. 423, pl. 6, fig. 2. Utah.

PYTHONISSA.

C. Koch. Uebers d. Arachn., Syst., I, p. 16. 1837.

1861. Westring. Aran. Suec., p. 350.
1864. Simon. Hist. Nat. d'Araign., p. 120.
1874. *Callilepis* Westr. Bem. Arachn., V, Thorell, p. 43.
1878. *Pythonissa* Simon. Arachn. de France, IV, p. 192.

P. clara Keyserling. N. Sp. a. Am., VII. Verh. d. z. b. Ges. Wien, 1887, p. 429, pl. 6, fig. 6. Utah.
P. imbecilla Keyserling. *Ibid.*, p. 427, pl 6, fig. 5. Ky.
——— Emerton. N. Engl. Drass., Agal., and Dysd. Trans. Conn. Ac., VIII, 1890, p. 13, pl. 4, fig. 6. N. H., Mass.

PROSTHESIMA.

L. Koch. Aptera a. d. fr. Jura.; Abh. d. Nat. f. Ges. Nuernbg., V, p. 13. 1872.

1832. *Herpyllus* Hentz. Am. Journ. Sc. and Arts, p. 102 ad part.
1833. *Melanophora* C. Koch. Herr-Schaeff. Deutschl. Ins., 120, 20, 30.
1866. *Melanophora* L. Koch. Drassiden, pp. 2, 142.
1866. *Melanophora* Menge. Preuss. Spinn., p. 303.
1869. *Melanophora* Thorell. On Europ. Spid., p. 149.
1878. *Prosthesima* Simon. Arachn. de France, IV, p. 37.

P. atra (*Herpyllus*). Journ. Bost. Soc. Nat. Hist., V, p. 455. *Id.*, Spid. U. S., ed. Burgess, p. 91, pl. 11, fig. 3. Pa., N. Engl., Ohio, D. C., Va., Md., Utah, Colo., Cal.
——— Emerton. N. Engl. Drass., Agal., and Dysd. Trans. Conn. Ac., VIII, 1890, p. 8, pl. 3, fig. 6.
funesta Keyserling. N. Spid. a. Am., VII. Verh. d. z. b. Ges. Wien, 1887, p. 431, pl. 6, fig. 6.
melancholica Thorell. Aran. coll. in Colo. Bull. U. S. Geol. Surv., Terr., III, No. 2, p. 493.
P. bicolor Hentz (*Herpyllus*). Journ. Bost. Soc. Nat. Hist., V, p. 456. *Id.*, Spid. U. S., ed. Burgess, p. 91, pl. 11, fig. 4. N. C., Ala., Ohio, Va., D. C., Md.
P. bimaculata Keyserling. N. Spid. a. Am., VII. Verh. d. z. b. Ges. Wien, 1887, p. 433, pl. 6, fig. 9. Mass.
P. depressa Emerton. N. Engl. Drass., Agal. and Dysd. Trans. Conn. Ac., VIII, 1890, p. 9, pl. 3, fig. 8. Mass.
P. ecclesiastica Hentz. Journ. Bost. Soc. Nat. Hist., V, 455. *Id.*, Spid. U. S., ed. Burgess, p. 90, pl. 11, fig. 2. U. S.
——— Emerton. N. Engl. Drass., Agal., and Dysd. Trans. Conn. Ac., VIII, 1890, p. 9, pl. 3, fig. 7.
propinqua Keyserling. N. Spid. a. Am., VII. Verh. d. z. b. Ges. Wien, 1887, p. 430, pl. 6, fig. 7.
P. funesta Keyserling = *atra*.
P. melancholica Thorell = *atra*.

GNAPHOSA.

Latreille. Nouv. Dict. d'Hist. Nat., XXIV, p. 134. 1804.

1832. *Herpyllus* Hentz. Am. Journ. Sci. and Arts, p. 102, ad part.
1866. Menge Preuss. Spinn., p. 301.
1866. *Pythonissa* L. Koch. Drassiden, p. 6, ad part.
1869. *Gnaphosa* Thorell. On Europ. Spid., p. 143.
1878. *Gnaphosa* Simon. Arachn. de France, IV, p. 163.

G. brumalis Thorell. Spid. fr. Labrador. Proc. Bost. Soc. Nat. Hist., XVII, p. 497. Labrador, Mass., Colo., N. H.
——— Emerton. N. Engl. Drass., Agal., and Dysd. Trans. Conn. Ac., VIII, 1890, p. 11, pl. 3, fig. 5.
scudderi Thorell. Aran. coll. in Colo. Bull. U. S. Geol. Surv., Terr., III, No. 2, p. 491.
G. conspersa Thorell. Aran. coll. in Colo. Bull. U. S. Geol. Surv., Terr., III, No. 2, p. 489. Colo., N. Engl., N. Y.
——— Emerton. N. Engl. Drass., Agal., and Dysd. Trans. Conn. Ac., VIII, 1890, p. 12, pl. 4, fig. 4.
giganthea Keyserling. N. Spid. a. Am., VII. Verh. d. z. Ges. Wien, 1887, p. 424, pl. 6, fig. 3. N. Y.
G. fontinalis Keyserling. *Ibid.*, p. 428, pl. 6, fig. 4. Ky.
G. giganthea Keyserling = *conspersa.*
G. scudderii Thorell. = *brumalis.*

PŒCILOCHROA.

Westring. Bemerk. u. d. Arachn. Abh., V, Thorell. 1874.

1878. Simon. Arachn. de France, IV, p. 157.
1890. Emerton. N. Engl. Drass., etc. Trans. Conn. Ac., VIII, p. 10.

P. bilineata Hentz (*Herpyllus*). Journ. Bost. Soc. Nat. Hist., V, p. 456. *Id.*, Spid. U. S., ed. Burgess, p. 92, pl. 11, fig. 5. N. C., Ala., D. C., Va.
——— Emerton. N. Engl. Drass., etc. Trans. Conn. Ac., VIII, 1890, p. 11, pl. 4, fig. 3.
P. montana Emerton. *Ibid.*, p. 11, pl. 4, fig. 2.
P. variegata Hentz (*Herpyllus*). Journ. Bost. Soc. Nat. Hist., V, p. 458. *Id.*, Spid. U. S., ed. Burgess, p. 94, pl. 11, fig. 12. Mass., N. C., Ky., N. H., Conn., D. C., Pa., Va., Utah.
——— Emerton. N. Engl. Drass., etc. Trans. Conn. Ac., VIII, 1890, p. 10, pl. 4, fig. 1.

HERPYLLUS (Note 4).

Hentz. Amer. Journ. of Science and Arts, XXI, p. 102. 1832.

1847. Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 454.
1875. Hentz. Spid. U. S., ed. by Burgess, p. 90.

H. alarius Hentz = *Phrurolithus alarius.*
H. ater Hentz = *Prosthesima atra.*
H. auratus Hentz = *Micaria aurata.*
H. bicolor Hentz = *Prosthesima bicolor.*
H. bilineatus Hentz = *Pœcilochroa bilineata.*
H. crocatus Hentz = ♂ *Thargalia crocata.*

H. cruciger Hentz. Journ. Bost. Soc. Nat. Hist., v, p. 458. *Id.*, Spid. U. S., ed. Burgess, p. 95, pl. 11, fig. 11. N. C.
H. descriptus Hentz = ♀ *Thargalia crocata.*
H. dubius Hentz = *Phrurolithus dubius.*
H. ecclesiasticus Hentz = *Prosthesima ecclesiastica.*
H. longipalpis Hentz = *Thargalia longipalpis.*
H. marmoratus Hentz = *Thargalia marmorata.*
H. ornatus Hentz = *Thargalia ornata.*
H. parvus Hentz = *Phrurolithus parvus.*
H. pygmæus Hentz. Journ. Bost. Soc. Nat. Hist., v, p. 459. *Id.*, Spid. U. S., ed. Burgess, p. 96, pl. 11, fig. 16. Ala.
H. ramulosus Hentz. *Ibid.*, p. 459. *Id.*, *ibid.*, p. 95, pl. 11, fig. 14.
H. trilineatus Hentz = *Thargalia trilineata.*
H. variegatus Hentz = *Pœcilochroa variegata.*
H. vespa Hentz. Journ. Bost. Soc. Nat. Hist., v, p. 458. *Id.*, Spid. U. S., ed. Burgess, p. 95, pl. 11, fig. 13. Ala., Tenn., D. C., Va.
H. zonarius Hentz = *Thargalia zonaria.*

Family DICTYNIDÆ.

1840. *Ciniflonidæ* Blackw. Trans. Linnean Soc., XVIII, p. 4, p. 601.
1852. *Tubicola* Dolesch. Syst. Verzeichn., etc., p. 14 ad part.
1861. *Ciniflonidæ* Blackw. Spid. of Gr. Brit., I, p. 139.
1869. *Amaurobinæ* Subfam. Thorell on Europ. Spiders, p. 121.
1870. *Dictynidæ* Simon. Aran. nouv. du midi de l'Europe.
1872. *Dictynidæ* Cambridge. Gen. list. of Sp. fr. Palestine and Syria, pp. 212, 260.
1874. *Dictynidæ* Simon. Arachn. de France, I, p. 175.
1888. *Ciniflonidæ* (Note 4) Emerton. Trans. Conn. Ac., VII, ad part.

DICTYNA.

Sundyvall. Consp. Arachn., p. 16. 1833.

1840. *Ergatis* Blackw. The diff. in the n. of Eyes, etc., p. 608.
1840. *Operaria* Blackw. Proceed. of the Linn. Soc., I, p. 66.
1847. *Argus* Walck. Ins. Apt., IV, p. 500 (ad max. part).
1888. *Dictyna* Emerton. N. Engl. Ciniflon. Trans. Conn. Ac., VII, p. 444.

***D. annulipes** Blackw. (*Ergatis*). Spid. from Canada. Ann. and Mag. of Nat. Hist., XVII, p. 42. Canada.
D. arundinaceoides Keyserling. N. Sp. a. Am., V. Verh. d. z. b. Ges. Wien, 1883, p. 665 (19), pl. 21, fig. 14. Col.
D. borealis Keyserling. *Ibid.*, VII, *ibid.*, 1887, p. 473 (53), pl. 6, fig. 34. Point Barrow, Alaska.
D. bostonensis Emerton. N. Engl. Ciniflonidæ. Trans. Conn. Ac., VII, p. 447, pl. 9, fig. 3. Mass.
D. cruciata *Id.* *Ibid.*, p. 448, pl. 9, fig. 6. Mass., Conn.
D. diligens Blackw. (*Ergatis*). Spid. fr. Montreal. Ann. and Mag. Nat. Hist., VIII, p. 429. Canada.
D. foliata Keyserling. N. Sp. a. Am., IV. Ver. d. z. b. Ges. Wien, 1882, p. 216, (24), pl. 15, fig. 15. Colo.
D. frondea Emerton. N. Engl. Cinifl. Trans. Conn. Ac., VII, p. 449, pl. 9, fig. 9. N. Engl.
D. longispina *Id.* *Ibid.*, p. 446, pl. 9, fig. 4. Mass.
D. minuta *Id.* *Ibid.*, p. 447, pl. 9, fig. 5. Conn., R. I.
D. muraria *Id.* *Ibid.*, p. 445, pl. 9, fig. 1. N. H., Mass., N. Y., Conn. (probably *arundinaceoides* Ksl.).

D. pallida Keyserling. N. Sp. a. Am., vii. Verh. d. z. b. Ges. Wien, 1887, p. 472 (52), pl. 6, fig. 33. D. C., Va.

D. rubra Emerton. N. Engl. Cinifl. Trans. Conn. Ac., vii, p. 448, pl. 9, fig. 7. Conn., Mass.

D. sedentaria Keyserling. N. Sp. a. Am., ii. Verh. d. z. b. Ges. Wien, 1880, p. 515 (29), pl. 16, fig. 20. Md., D. C.

D. vittata Keyserling. N. Sp. a. Am., v. *Ibid.*, 1883, p. 663 (17), pl. 21, fig. 12. D. C.

D. volucripes Keyserling. N. Sp. a. Am., iii. *Ibid.*, 1881, p. 286 (20), pl. 2, fig. 2. Mass., D. C., Md.

——— Emerton. N. Engl. Cinifl. Trans. Conn. Ac., vii, p. 446, pl. 9, fig. 2, pl. 2, fig. 3.

D. volupis Keyserling. N. Sp. a. Am., iii. Verh. d. z. b. Ges. Wien, 1881, p. 285 (19), pl. 2, fig. 10. Mass., D. C.

——— Keyserling. N. Sp. a. Am. v. *Ibid.*, 1883, p. 665 (18), pl. 21, fig. 13.

——— Emerton. N. Engl. Cinifl. Trans. Conn. Ac., vii, p. 448, pl. 9, fig. 8.

AMAUROBIUS.

C. Koch. Uebers. d'Arachn. Syst., i, p. 15 ad part. 1837.

1841. *Ciniflo.* Blackw. The differ. in the numb. of Eyes, etc., p. 607.
1861. *Ciniflo Id.* Sp. of Gr. Brit., i, p. 139.
1888. *Amaurobius* Emerton. N. Engl. Cinifl. Trans. Conn. Ac., vii, p. 450.

A. bennetti Blackw. Spid. fr. Canada. Ann. and Mag. of Nat. Hist., xvii, p. 41. Canada.

***A. claustrarius** C. Koch. Die Arachn., xii, p. 114, fig. 830. D. C., Dak., Pa., Colo., Wyo., Oregon.

***A. ferox** Walck. (*Clubiona*). Ins. Apt., i, p. 606. N. Engl., Pa., D. C., Cal., Dak., Mont.

——— Emerton. N. Engl. Cinifl. Trans. Conn. Ac., vii, p. 451. Mass., R. I., Conn.

A. nevadensis Simon. Bull. Soc. Zool., ix, p. 12, sep. Nev.

A. pictus Simon. *Ibid.* Wash.

A. severus Simon. *Ibid.* Wash.

A. sylvestris Emerton. N. Engl. Cinifl. Trans. Conn. Ac., vii, p. 451, pl. 10, fig. 1. N. Engl., (probably *claustrarius*).

A. tibialis Emerton. *Ibid.*, p. 452, pl. 10, fig. 3. N. H.

TITANŒCA.

Thorell. On Europ. Spid., p. 124. 1869.

T. americana Emerton. N. Engl. Cinifl. Trans. Conn. Ac., vii, p. 453, pl. 10, fig. 4. Conn., N. H.

T. brunnea Emerton. *Ibid.*, p. 453, pl. 10, fig. 5. Conn.

Family UROCTEIDÆ (Note 5).

1869. Thorell. On Europ. Spid., p. 110.
1875. Simon. Arachn. de France, ii, p. 1.

THALAMIA.

Hentz. Journ. Bost. Soc. Nat. Hist., vi, p. 31. 1850.

1875. *Id.* Spid. of the U. S., ed. by Burgess, p. 140.

T. parietalis Hentz. Journ. Bost. Soc. Nat. Hist., vi, p. 31. *Id.*, Spid. U. S., ed. Burgess, p. 141 pl. 15, fig. 16. Ala.

Family CLUBIONIDÆ.

1878. *Clubioninæ* (subfam.) Simon. Arachn. de France, IV, p. 208.
1889. Marx (Note 6).

ANYPHÆNA.

Sundev. Sv. Spindl. Bescr. Vet. Akad. Handl., p. 125. 1831.

1866. L. Koch. Die Arachn. fam. d. Drassiden, pp. 2, 194.
1869. Thorell. On Europ. Spid, p. 143.
1875. Simon. Arachn. de France, IV, p. 265.
1878. Bertkau. Vers. e. nat. Anordn. d. Spinn. Arch. f. Naturgesch., XLIV, p. 379.
1890. Emerton. N. Engl. Drass., Agal., and Dysd. Trans. Conn. Ac., VIII, p. 21.

A. agrestis Hentz (*Clubiona*). Journ. Bost. Soc. Nat. Hist., V, p. 453. *Id.*, Spid. U. S., ed. Burgess, p. 88, pl. 10, fig. 21. Ala., Va., D. C., Md.
——— L. Koch. Die Arachn. fam. d. Drassiden, p. 224.
A. argentata Becker. Ann. Soc. Ent. Belgique, XXII, p. 54, pl. 1, figs. 12, 13, 14. New Orleans, La.
A. calcarata Emerton. N. Engl. Dras., etc. Trans. Conn. Ac., VIII, 1890, p. 23, pl. 6, fig. 3. Conn., N. Y.
A. conspersa Keyserling. N. Sp. a. Am., VII. Verh. d. z. b. Ges. Wien, 1887, p. 453 (33), pl. 6, fig. 23. Ky.
A. fallens Hentz (*Clubiona*). Journ. Bost. Soc. Nat. Hist., V, p. 451. *Id.*, Spid. U. S., ed. Burgess, p. 86, pl. 10, fig. 17. Ala., Va., D. C.
——— L. Koch. Die Arachn. fam. d. Drassiden, p. 24.
A. gracilis Hentz (*Clubiona*). *Ibid.*, p. 452. *Id.*, *ibid.*, p. 86, pl. 10, fig. 19. N. C., Ala., Va., D. C., Md.
——— L. Koch. Die Arachn. fam. d. Drassiden, p. 195, pl. 8, fig. 130.
A. incerta Keyserling. N. Sp. a. Am., VII. Verh. d. z. b. Ges. Wien, 1887, p. 452, (32), pl. 6, fig. 22. Mass.
——— Emerton. N. Engl. Drass., etc. Trans. Conn. Ac., VIII, 1890, p. 22, pl. 6, fig. 2.
A. inclusa Hentz (*Clubiona*). Journ. Bost. Soc. Nat. Hist., V, p. 451. *Id.*, Spid. U. S., ed. Burgess, p. 85, pl. 10, fig. 18. S. C., N. C., D. C., Va.
——— L. Koch. Die Arachn. fam. d. Drassiden, p. 224.
A. pectorosa L. Koch. Die Arachn. fam. d. Drassiden, p. 198, pl. 8, fig. 131. Md.
A. rubra Emerton. N. Engl. Drass., etc. Trans. Conn. Ac., VIII, 1890, p. 22, pl. 6, fig. 1. Mass., Conn., N. Y.
A. saltabunda Hentz (*Clubiona*). Journ. Bost. Soc. Nat. Hist., V, p. 453. *Id.*, Spid. U. S, ed. Burgess, p. 89, pl. 10, fig. 23. Ala., Mass., D. C., Va., Conn., Pa.
——— Emerton. N. Engl. Drass., etc. Trans. Conn. Ac., VIII, 1890, p. 23, pl. 6, fig. 4.
A. striata Becker. Ann. Soc. Ent. Belgique, XXII, p. 84, pl. 2, fig. 8. Miss.
A. sublurida Hentz (*Clubiona*). Journ. Bost. Soc. Nat. Hist., V, p. 543. *Id.*, Spid. U. S., ed. Burgess, p. 88, pl. 11, fig. 1. Ala., D. C., Va.
——— L. Koch. Die Arachn. fam. d. Drassiden, p. 224.
A. velox Becker. Ann. Soc. Entom. Belgique, XXII, p. 83, pl. 2, figs. 5, 6, 7. Miss.

CLUBIONA.

Latreille. Nouv. Dict. d'Hist. Nat., XXIV, p. 134. 1804.

1832. Hentz. Am. Journ. Science and Art, XXI, p. 102 *ad part.*
1847. Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 449 *ad part.*
1861. Blackw. Spid. of Gr. Brit., I, p. 121 *ad part.*
1866. L. Koch. Die Arachn. fam. d. Drassiden, pp. 2, 291.

1869. Thorell. On Europ. Spid., p. 144.
1878. Simon. Arachn. de France, IV, p. 210.
1890. Emerton. N. Engl. Drass., Agal., and Dysd. Trans. Conn. Ac., VIII, 1890, p. 15.

C. abboti L. Koch. Die Arachn. fam. d. Drassiden, p. 303, pl. 12, fig. 193. Md.
C. agrestis Hentz=*Anyphæna agrestis.*
C. albens Hentz=*Chiracanthium albens.*
C. canadensis Emerton. N. Engl. Drass., etc. Trans. Conn. Ac., VIII, 1890, p. 17, pl. 5, fig. 4. N. H., Canada.
C. celer Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 452. *Id.*, Spid. U. S., ed. Burgess, p. 87, pl. 10, fig. 20. N. C., Ala.
C. crassipalpis Keyserling. N. Spid. a. Am., VII. Verh. d. z. b. Ges. Wien, 1887, p. 438 (18), pl. 6, fig. 13. Mass., Conn., R. I., N. Y.
——— Emerton. N. Engl. Drass., etc. Trans. Conn. Ac., VIII, 1890, p. 16, pl. 5, fig. 1.
C. excepta L. Koch = *pallens.*
C. fallens Hentz=*Anyphæna fallens.*
C. frigidula Thorell. Spid. fr. Labrador. Proc. Bost. Soc. Nat. Hist., XVII, p. 496. Labrador.
C. gracilis Hentz=*Anyphæna gracilis.*
C. immatura Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 453. *Id.*, Spid. U. S., ed. Burgess, p. 88, pl. 10, fig. 22. Ala.
C. inclusa Hentz=*Anyphæna inclusa.*
C. minuta Emerton. N. Engl. Drass., etc. Trans. Conn. Ac., VIII, 1890, p. 17, pl. 5, fig. 11. Mass.
C. mixta Emerton. *Ibid.*, p. 16, pl. 5, fig. 2. Mass.
C. obesa Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 450. *Id.*, Spid. U. S., ed. Burgess, p. 84, pl. 10, fig. 14. Mass., N. C., Ala., D. C., Mich.
C. ornata Emerton. N. Engl. Drass., etc. Trans. Conn. Ac, VIII, 1890, p. 19, pl. 5, fig. 9. N. H., Mass.
C. pallens Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 449. *Id.*, Spid. U. S., ed. Burgess, p. 83, pl. 10, fig. 13. Ala., N. C., D. C., Md., Va.
excepta L. Koch. Die Arachn. fam. d. Drassiden, p. 300, pl. 12, fig. 191. Md.
——— Emerton. N. Engl. Drass., etc. Trans. Conn. Ac., VIII, 1890, p. 19, pl. 5, fig. 10.
C. piscatoria Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 450. *Id.*, Spid. U. S., ed. Burgess, p. 84, pl. 10, fig. 15. Ala.
C. pusilla Emerton. N. Engl. Drass., etc. Trans. Conn. Ac., VIII, 1890, p. 17, pl. 5, fig. 5. Mass.
C. riparia L. Koch. Die Arachn. fam. d. Drassiden, p. 294, pl. 12, fig. 187. Md.
C. rubra Keyserling. N. Sp. a. Am., VII. Verh. d. z. b. Ges. Wien, 1887, p. 436 (16), pl. 6, fig. 12. Mass., Conn., N. C.
——— Emerton. N. Engl. Drass., etc. Trans. Conn. Ac., VIII, 1890, p. 18, pl. 5, figs. 5, 6, 7.
C. saltabunda Hentz=*Anyphæna saltabunda.*
C. sublurida Hentz = *Anyphæna sublurida.*
C. tranquilla Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 450. *Id.*, Spid. U. S., ed. Burgess, p. 89, pl. 10, fig. 16. U. S.

CHIRACANTHIUM.

C. Koch. Die Arachniden, VI, p. 9. 1839.

1861. Westring. Araneae. Suec., p. 377.
1869. Thorell. On Europ. Spid., p. 145.
1866. L. Koch. Die Arachn. fam. d. Drass., pp. 2, 231.
1878. Simon. Arachn. de France, IV, p. 240.

C. albens Hentz (*Clubiona*). Journ. Bost. Soc. Nat. Hist., v, p. 454. *Id.*, Spid. U. S., ed. Burgess, p. 89, pl. 10, fig. 24. Ala., Va., D. C., Md., Pa., Ga., Fla.
——— L. Koch. Die Arachn fam. d. Drassiden, p. 270.
C. viride Emerton. N. Engl. Drass., etc. Trans. Conn. Ac., VIII, 1890, p. 20, pl. 5, fig. 12. Mass.

TRACHELAS.

L. Koch. Die Arachn. fam. d. Drassiden, p. 2. 1866.

1869. Thorell. On Europ. Spid., pp. 139, 142.
1878. Simon. Arachn. de France, IV, 281.

T. ruber Keyserling. N. Sp. a. Am., VII. Verh. d. z. b. Ges. Wien, 1887, p. 439 (19), pl. 6, fig. 14. Mass., Pa., Md., D. C., Va., Ga., S. C., N. C., Ala.
——— Emerton. N. Engl. Drass., etc. Trans. Conn. Ac., VIII, 1890, p. 20, pl. 5, fig. 13.

HILKE.

Keyserling. N. Sp. a. Am., VII. Verh. d. z. b. Ges. Wien, p. 444 (24). 1887.

H. trivittata Keyserling. *Ibid.*, p. 444 (24), pl. 6, fig. 17. Cal.

THARGALIA (Note 7).

Karsch. Zeitschr. f. ges. Naturw., LIII, p. 374. 1880.

Corinna C. Koch. Die Arachn. IX, p, 20, etc., ad part.
Geotrecha Emerton. N. Engl. Drass., etc. Trans. Conn. Ac., VIII, 1890, p. 4.

T. amœna C. Koch (*Corinna*). Die Arachn., IX, p. 21, fig. 705. Carolina, Fla., Tex., Utah.
T. bivittata Keyserling (*Castianeira*). N. Sp. a. Am., VII. Verh. d. z. b. Ges. Wien, 1887, p. 442, pl. 6, fig. 16. Mass.
——— Emerton (*Geotrecha*). N. Engl. Drass., etc. Trans. Conn. Ac., VIII, 1890, p. 5, pl. 3, fig. 3.
T. cinculata C. Koch (*Corinna*). *Ibid.*, p. 22, fig. 706. Pa., D. C., Md.
T. crocata Hentz (*Herpyllus*). Journ. Bost. Soc. Nat. Hist., v, p. 457. *Id.*, Spid. U. S., ed. Burgess, p. 93, pl. 11, fig. 8. Ala., Ohio, Mass., Conn., N. Y., D. C., Va.
descriptus Hentz (*Herpyllus*). *Ibid.*, p. 456. *Id.*, *ibid.*, p. 92, pl. 11, fig. 7. N. C., Ala., Mass., Pa., D. C.
Agrœca crocata Keyserling. N. Sp. a. Am., VII. Verh. d. z. b. Ges. Wien, 1887, p. 436.
Geotrecha crocata Emerton. N. Engl. Drass., etc. Trans. Conn. Ac., VIII, 1890, p. 7, pl. 3, fig. 3.
T. descripta Hentz = *crocata* ♂.
T. longipalpis Hentz (*Herpyllus*). Journ. Bost. Soc. Nat. Hist., v, p. 457. *Id.*, Spid. U. S., ed. Burgess, p. 93, pl. 2, fig. 9. Ala., Ga., Fla.
T. marmorata Hentz (*Herpyllus*). *Ibid.*, p. 458. *Id.*, *ibid.*, p. 94, pl. 11, fig. 10. Ala.

T. ornata Hentz (*Herpyllus*). *Ibid.*, p. 456. *Id.*, *ibid.*, p. 92, pl. 2, fig. 6. N. C., Va., D. C.

T. pinnata Emerton (*Geotrecha*). N. Engl. Drass., etc. Trans. Conn. Ac., VIII, 1890, p. 6, pl. 3, fig. 4. Mass., N. Y.

T. tricolor C. Koch (*Corinna*). Die Arachn., IX, p. 24, fig. 707. Pa., Colo., Utah, Nebr.

T. trilineata Hentz (*Herpyllus*). Journ. Bost. Soc. Nat. Hist., V, p. 460. *Id.*, Spid. U. S., ed. Burgess, p. 97, pl. 2, fig. 18. Ala., Ga., D. C., Va., Ohio, Ind.

T. zonoria Hentz (?) (*Herpyllus*). Journ. Bost. Soc. Nat. Hist., V, p. 460. *Id.*, Spid. U. S., ed. Burgess, p. 97, pl. 2, fig. 17. Ala., Ga., Tex.

AGRŒCA.

Westring. Aran. Suec., p. 311. 1861.

1868. L. Koch. Die Arachn. fam. d. Drassiden, p. 2.
1869. Thorell. On Europ. Spid., p. 135.
1878. Simon. Arachn. de France, IV, p. 298.

A. crocata Keyserling = *Thargalia crocata.*

A. tristis Keyserling. N. Sp. a. Am., VII. Verh. d. z. b. Ges. Wien, p. 436 (16), pl. 6, fig. 2. Md.

A. walsinghamii Cambridge. On New Drass. Proc. Lond. Zool. Soc., XXV, 1874, p. 416. Oregon.

PHRUROLITHUS.

C. Koch. Die Arachn., VI *ad part*, p. 110. 1839.

1851. Westring. Fœrteckn., etc., p. 46.
1864. L. Koch. Die Arachn. fam. d. Drass., pp. 2, 224.
1890. Emerton. N. Engl. Drass., Agal., and Dysd. Trans. Conn. Ac., VIII, p. 24.

P. alarius Hentz (*Herpyllus*). Journ. Bost. Soc. Nat. Hist., V, p. 461. *Id.*, Spid. U. S., ed. Burgess, p. 98, pl. 11, fig. 20. Ala., Ga., D. C., R. I., Mass., Ohio.

——— Emerton. N. Engl. Drass., etc. Trans. Conn. Ac., VIII, 1890, p. 25, pl. 6, fig. 5.

P. dubius Hentz (*Herpyllus*). Journ. Bost. Soc. Nat. Hist., V, p. 461. *Id.*, Spid. U. S., ed. Burgess, p. 98. S. C., D. C.

P. parcus Hentz (*Herpyllus*). *Ibid.*, p. 461. *Id.*, *ibid.*, p. 97, pl. 11, fig. 19. Ala., Ga.

P. pugnatus Emerton. N. Engl. Drass., etc. Trans. Conn. Ac., VIII, 1890, p. 24, pl. 6, fig. 6. Mass., Conn., D. C., Va., Colo., Utah, Wash., Oregon.

Geotrecha Emerton = *Thargalia.*

bivittata Emerton = *Thargalia bivittata.*
crocata Emerton = *Thargata crocala,*
pinnata Emerton = *Thargalia pinnata.*

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Family CATADYSIDÆ (Note 8).

Thorell. On Europ. Spid., pp. 42, 43. 1869.

Bertkau. Vers. e. Nat. Anord. d. Sp. Archiv. f. Naturg., XLI, I, p. 361.

CATADYSAS (Katadysas.)

Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 287. 1850.

1869. Thorell. On Europ. Spid., pp. 43, 161.
1871. Ausserer. Beitr. z. K. d. Territel., p. 123.
1875. *Id.* Zweit. Beitr. z. K. d. Territel., p. 131.
1878. **Bertkau.** Vers. e. nat. Anord. d. Sp. Archiv. f. Naturg., XLI, p. 361.

C. pumilus Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 287. *Id.*, Sp. U. S., ed. Burgess, p. 160, pl. 17, fig. 16. Ala.

Family AGALENIDÆ.

1837. *Agalenides* C. Koch. Uebers d. Arachn. Syst., I, p. 13 ad part.
1852. *Tubicola* Doleschall. Syst. Verzeichn, p. 14.
1869. *Agalenidæ* Thorell. On Europ. Spid., p. 127 (subfam.).
1875. *Agalenidæ* Simon. Arachn. de France, II, p. 13.
1890. *Agalenidæ* Emerton. N. Engl. Drass., Agal., and Dysd. Trans. Conn. Ac. VIII, p. 26.

AGALENA.

Walck. Tabl. d'Aran., p. 51. 1805.

1832. Hentz. Amer. Journ. Science and Arts, XXI, p. 103.
1847. Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 464.
1875. Hentz. Sp. U. S , ed. Burgess, p. 102.
1890. Emerton. N. Engl. Drass., etc. Trans. Conn. Ac., VIII, p. 33.

A. americana Keyserling. Spinn. a. Uruguay u. a. Geg. Am. Verh. d. z. b. Ges. Wien, 1878, p. 599 (31), pl. 14, figs. 20, 21. N. A.
A. hentzii Becker. Ann. Soc. Ent. Belgique, XXII, p. 81, pl. 2, fig. 1–4. New Orleans, La.
A. nævia Walck. Bosc. MSS. Ins. Apt., II, p. 24. U. S.
——— Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 465. *Id.*, Sp. U. S., ed. Burgess, p. 102, pl. 12, fig. 1, pl. 20, fig. 20.
——— Cragin. Contr. to Knowl. of Arachn. of Kansas. Bull. Washburn Coll., I, No. 4, p. 146.
——— Emerton. N. Engl. Drass., etc. Trans. Conn. Ac., VIII, 1890, p. 33, pl. 8, fig. 1.
Agelena pennsylvanica C. Koch. Die Arachn., X, p. 111, fig. 828.
Agelena potterii Blackw. Sp. fr. Canada. Ann. and Mag. Nat. Hist., XVII, p. 43.
Agalenopsis albipilis Giebel. Spinn. a. Illinois. Zeitschr. f. ges. Naturw., XXXIII, p. 250.
A. pennsylvanica C. Koch = *nævia*
A. plumbea Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 465. *Id.*, Sp. U. S., ed. Burgess, p. 103, pl. 12, fig. 2. N. C., Ala.
A. potteri Blackw. = *nævia.*

Agalenopsis Giebel = *Agalena.*

A. albipilis Giebel = *Agalena nævia.*

TEGENARIA.

Latreille. Nouv. Diction d'Hist. Nat., XXIV, p. 134. 1804.

1832. Hentz. Am. Journ. Science and Arts, XXI, p. 102.
1837. *Philoica* C. Koch. Uebers d. Arachn. Syst., I, p. 13.
1847. Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 462.
1869. Thorell. On Europ. Spid., p. 129.
1875. Hentz. Spid. U. S., ed. by Burgess, p. 99.
1890. Emerton. N. Engl. Drass., etc. Trans. Conn. Ac., VIII, 1890, p. 29.

T. arboricola Walck. Abbot Ga. Sp. Ins. Apt., II, p. 6. Ga.

T. brevis Emerton. N. Engl. Drass., etc. Trans. Conn. Ac., VIII, 1890, p. 30, pl. 7, fig. 5. N. H., Mass., Conn.

T. civilis Walck. = *derhami* Scop.

T. derhami Scopoli. Entom. Carnioli, p. 400.

——— Emerton. N. Engl. Drass., etc. Trans. Conn. Ac., VIII, 1890, p. 29, pl. 7, fig. 6.
Araneus domesticus Clerk. Sv. Spindl., p. 76, pl. 2, tab. 9, fig. 2.
Aranea domestica Linn. Syst. Natural Ed., X, I, p. 620.
Tegenaria civilis Walck. Tabl. d'Aran.
Tegenaria civilis C. Koch. Die Arachn., VIII, p. 37, figs. 618, 619.
Tegenaria civilis Blackw. Spid. of Gr. Brit., I, p. 166, fig. 107.
Tegenaria civilis Id. Sp. fr. Canada. Ann. Mag. Nat. Hist., XVII, p. 76.
Tegenaria medicinalis Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 462. *Id.*, Sp. U. S., ed. Burgess, p. 99, pl. 11, fig. 21, pl. 20, fig. 19.

T. flavens Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 464. *Id.*, Spid. U. S., ed. Burgess, p. 101, pl. 11, fig. 22. Ala.

T. medicinalis Hentz = *derhami*.

T. nemorensis Walck. Abbot Ga. Sp. Ins. Apt., II, p. 10. Ga.

T. persica Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 462. *Id.*, Spid. U. S., ed. Burgess, p. 101, pl. 11, fig. 23. Ala.

T. philosteichos McCook. On Webs of New Spec. of Spid. Proc. Ac. Nat. Sc. Phila., 1876, p. 201.

CICURINA.

Menge. Preuss. Spinn., p. 271. 1871.

1875. Simon. Arachn. de France, II, p. 20.
1890. Emerton. N. Engl. Drass., etc. Trans. Conn. Ac., VIII, 1890, p. 31.

C. arcuata Keyserling. N. Sp. a. Am., VII. Verh. d. z. b. Ges. Wien, 1887, p. 460 (40), pl. 6, fig. 25. Colo., Ill., Minn., Va., D. C., Lake Superior, Pa., N. H.

C. complicata Emerton. N. Engl. Drass., etc. Trans. Conn. Ac., VIII, 1890, p. 31, pl. 7, fig. 7. Mass.

C. nevadensis Simon. Comptes Rend. Soc. Ent. Belgique, XX, No. 70, p. 59. Nevada.

C. pallida Keyserling. N. Sp. a. Am., VII. Verh. d. z. b. Ges. Wien, 1887, p. 462 (42), pl. 6, fig. 26. D. C.

C. robusta Simon. Comptes Rend. Soc. Ent. Belgique, XX, No. 70, p. 60. Colo.

C. simplex Simon. *Ibid.*, p. 59. Wash.

C. tersa Simon. *Ibid.*, p. 58. Wash.

CYBÆUS.

L. Koch. Die Arachn. gatt. Amaur. Coel. u. Cyb., p. 46. 1868.

1869. Thorell. On Europ. Spid., p. 127.
1875. Simon. Les Arachn. de France, II, p. 16.

C. morosus Simon. Comptes Rend. Soc, Ent. Belgique, XX, No. 70, p. 57. Wash.
C. pusillus Simon. *Ibid.*, p. 57. Wash.
C. reticulatus Simon. *Ibid.*, p. 56. Wash.
C. signifer Simon. *Ibid.*, p. 56. Wash.

CŒLOTES.

Blackwall. The diff. in the number of eyes, etc. 1841.

1868. L. Koch. Die Arachn. Gatt. Amaurob. Cœlotes and Cybæus, p. 12.
1869. Thorell. On Europ. Spid., p. 128.
1890. Emerton. N. Engl. Drass., Agal., and Dysd. Trans. Conn. Ac., VIII, p. 27.

C. calcaratus Keyserling. N. Spid. a. Am., VII. Verh. d. z. b. Ges. Wien, 1887, p. 470 (50), pl. 6, fig. 32. D. C., Colo., Wyo., Minn.
C. hybridus Emerton. N. Engl. Drass., etc. Trans. Conn. Ac., VIII, 1890, p. 29, pl. 7, fig. 4. N. Y.
C. juvenilis Keyserling. N. Spid. a. Am., III. *Ibid.*, 1881, p. 288, pl. 11, fig. 13. Ky.
C. lamellosus Keyserling. N. Spid. a. Am., VII. *Ibid.*, 1887, p. 469 (49), pl. 6, fig. 30. Va., Pa., Lake Superior.
C. longitarsus Emerton. N. Engl. Drass., etc. Trans. Conn. Ac., VIII, 1890, p. 28, pl. 7, fig. 2. Conn.
C. medicinalis (Note 9) Emerton. *Ibid.*, p. 27, pl. 7, fig. 1. N. Y., Mass.
C. montanus Emerton. *Ibid.*, p. 28, pl. 7, fig. 3. N. Y., Conn.
C. urbanus Keyserling. *Ibid.*, VII. *Ibid.*, p. 467 (47), pl. 6, fig. 31. D. C.

HAHNIA.

C. Koch. Die Arachn., VIII, pp. 23, 61. 1841.

1869. Menge. Preuss. Spinn., p. 251, ad part.
1869. Thorell. On Europ. Spid., p. 131.
1875. Simon. Arachn. de France, II, p. 129.
1890. Emerton. N. Engl. Drass., etc. Trans. Conn. Ac., VIII, p. 31.

H. agilis Keyserling. N. Spid. a. Am., VII. Verh. d. z. b. Ges. Wien, 1887, p. 465 (45), pl. 6, fig. 29. D. C., Dak., Pa.
H. bimaculata Emerton. N. Engl. Drass., etc. Trans. Conn. Ac., VIII, 1890, p. 32, pl. 7, fig, 8. Mass., Conn., N. H.
H. cinerea Emerton. *Ibid.*, p. 33, pl. 7, fig. 9. Mass., Conn.
H. magna Keyserling. *Ibid.*, p. 464 (44), pl. 6, fig. 28. Wyo.
H. radula Emerton. N. Engl. Drass., etc. Trans. Conn. Ac., VIII, 1890, p. 32. N. H.
H. riparia Keyserling. *Ibid.*, p. 463 (43), pl. 6, fig. 27. Utah.

HAMALATIVÆ (Note 10).

Keyserling. N. Spid. a. Am., VII. Verh. d. z. b. Ges. Wien, p. 457 (37). 1887.

H. crisea Keyserling. *Ibid.*, p. 458 (38), pl. 6, fig. 24. Fla., Va.

Family DINOPIDÆ.

1839. MacLeay. On s. n. forms of Arachn. Ann. and Mag. of N. H., II, p. 6.
1850. *Dinopides* C. Koch. Uebers d. Arachn. Syst., V, p. 41.
1869. *Dinopoidæ* Thorell. On Europ. Spid., pp. 43, 198, 204.
1873. Taczanowski. Hor. Soc. Ent. Rossicæ, X, p. 99.
1877. Cambridge. Proc. Lond. Zool. Soc., p. 573.
1878. Karsch. Exot. Araneol. Zeitschr. f. g. Naturw., p. 331.

DINOPIS (Deinopis).

MacLeay. Ann. and Mag. of Nat. Hist., II, p. 9. 1839.

1869. Thorell. On Europ. Spid., p. 43.
1877. Cambridge. Proc. Lond. Zool. Soc., p. 573.
1878. Karsh. Exot. Araneol. Zeitschr. f. g. Naturw., p. 332.

D. spinosus Marx. Proc. Acad. Nat. Sci., Philadelphia, 1889, p. 341, pl. 11, fig. a. m. Fla., Ala.

Tribus VI RETITELARIÆ.

Family PRODIDOMIDÆ (Note 11).

1875. Miltioidæ Thorell. On Synonyms, p. 602.

PRODIDOMUS.

Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 466. 1847.

1869. *Miltia* Simon. Revue and Mag. de Zoologie.
1875. Hentz. Spid. of the U. S., ed. by Burgess, p. 105.
1884. Simon. Note Synon. s. l. g. Prodidomus. Compt. rend. Soc. Ent., Belgique, p. 302 (6).

P. rufus Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 467. *Id.*, Spid. U. S., ed. Burgess, p. 105, pl. 12, fig. 3, pl. 18, fig. 9. Ala.

Family THERIDIDÆ.

1837. *Theridides* C. Koch. Uebers. d. Arachn. Syst., V, p. 6, ad max. part.
1882. *Therididæ* Emerton. Trans. Conn. Ac., VI, p. 1.
1884. *Theridiidæ* Keyserling. Die Spinn. Am., Theridiidæ.

THERIDIUM.

Walck. Tabl. d'Aran., p. 72, 1805.

1832. *Theridium* Hentz. Am. Journ. of Sc. and Arts, XXI, p. 99.
1850. *Theridion Id.* Journ. Bost. Soc. Nat. Hist., VI, p. 271.
1875. *Theridion Id.* Spid. U. S., ed. Burgess, pp. 5, 142.
1882. *Theridium* Emerton. N. Engl. Therididæ. Trans. Conn. Ac., VI, p. 8.
1884. *Theridium* Keyserling. Die Spinn. Am., Theridiidæ, p. 3.

T. amputatum Keyserling. Die Spinn. Am., Theridiidæ, I, p. 90, fig. 58. Fla.
T. anglicanum Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 275. *Id.*, Spid. U. S., ed. Burgess, p. 146, pl. 16, fig. 6. Ala.
T. ansatum Walck. Abbot Ga. Spid. Ins. Apt., II, p. 320. Ga.

T. antonii Keyserling. Die Spinn. Am., Theridiidæ, I, p. 54, fig. 31. Texas.

T. atrilabrum Walck. Bosc. Ins. Apt., II, p. 319. Carolina.

T. blandum Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 278. *Id.*, Spid. U. S., ed. Burgess, p. 150, pl. 16, fig. 20. Ala.

T. boreale Hentz = *Steatoda borealis.*

T. brassicæ Fitch. Thirteenth Report Trans. N. Y. St. Agric. Soc., XXVII, p. 563. N. Y.

T. cancellatum Hentz = *Argyrodes cancellatus.*

T. catenatum Walck. Abbot Ga. Spid. Ins. Apt. II, p. 289. Ga.

T. cruciatum Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 275. *Id.*, Spid. U. S., ed. Burgess, p. 147, pl. 16, fig. 8. Ala.

T. differens Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 9, pl. 1, fig. 1. N. H., Me., Mass., Conn., Va., D. C., Fla., Tex.

——— Keyserling. Die Spinn. Am., Therid., I, p. 54, fig. 30.

T. fictilium Hentz = *Ariamnes fictilium.*

T. flavonotatum Becker. Ann. Soc. Ent. Belg. XXII, p. 79, pl. 1, figs. 7, 8, 9. Miss., D. C.

T. foliaceum Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 277. *Id.*, Spid. U. S., ed. Burgess, p. 149, pl. 16, fig. 14. Ala.

T. frondeum Hentz. *Ibid.*, p. 275. *Id.*, *ibid.*, p. 146, pl. 16, fig. 7. Ala., N. Engl., Md., Ill., D. C., Va., N. Y., Pa.

——— Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 15, pl. 3, fig. 1.

——— Keyserling. Die Spinn. Am., Therid., I, p. 69, fig. 42.

T. funebre Hentz = *Euryopis funebris.*

T. glaucescens Becker. Ann. Soc. Ent. Belgique, XXII, p. 81, pl. 1, fig. 11. Miss.

T. globosum Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 279. *Id.*, Spid. U. S., ed. Burgess, p. 151, pl. 16, fig. 23. Ala., Mass., Conn.

——— Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 14, pl. 2, fig. 3.

——— Keyserling. Die Spinn. Am., Therid. I, p. 91, fig. 59. Ill.

T. hypophyllum Fitch. Thirteenth Rep. Trans. N. Y. St. Agric. Soc., XXVII, p. 564. N. Y.

T. incissuratum Walck. Abbot Ga. Spid. Ins. Apt., II, p. 307. Ga.

T. intentum Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 278. *Id.*, Spid. U. S., ed. Burgess, p. 150, pl. 16, fig. 19. Ala.

T. kentuckyense Keyserling. Die Spinn. Am., Therid. I, p. 78, fig. 47. Ky., Pa.

T. laticeps Keyserling. *Ibid.*, p. 96, fig. 63. Wyoming.

T. leoninum Hentz = *Ero furcata.*

T. lilliputanum Keyserling = *nicoleti.*

T. lineatum Hentz = *Lathrodectus mactans.*

***T. lineatum** Clerk (*Araneus*). Svenska Spindl., p. 60, pl. 3, tab. 10.

——— Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 16, pl. 3, fig. 2. Mass.

T. lyra Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 279. *Id.*, Spid. U. S., ed. Burgess, p. 150, pl. 16, fig. 21. Ala., Fla.

——— Keyserling. Die Spinn. Am., Therid. I, p. 50, fig. 28.

T. lyricum Walck. Abbot Ga. Spid. Ins. Apt., II, p. 288. Ga.

T. marmoratum Hentz = *Lithyphantes marmoratus.*

T. marxii Keyserling. Die Spinn. Am., Therid. I, p. 68, fig. 41. *Ibid.*, II, p. 231. fig. 285. Alaska.

T. montanum Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 10, pl. 1, fig. 3. N. H.

T. morologum Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 277. *Id.*, Spid. U. S., ed. Burgess, p. 148, pl. 16, fig. 13. Ala.

T. murarium Emerton. N. Engl. Therid., Trans. Conn. Ac., VI, p. 11, pl. 1, fig. 5. Mass., Conn., R. I., Ill., Colo., Pa., Md., D. C., Va.

——— Keyserling. Die Spinn. Am. Therid. I, p. 17, fig. 5.

T. nicoleti Keyserling. *Ibid.*, p. 88, fig. 56. D. C.

lilliputanum Keyserling (not Nicolet). *Ibid.*, p. 88, fig. 56.

T. opulentum Walck. Abbot Ga. Spid. Ins. Apt., II, p. 322. Ga.

T. orix Walck. Bosc. *Ibid.*, p. 313. Carolina.

T. ornatum Walck. Abbot Ga. Spid., *ibid.*, p. 329. Ga.

T. oscitabundum Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 275. *Id.*, Spid. U. S., ed. Burgess, p. 147, pl. 16, fig. 9. Ala.

T. pallidum Walck. Abbot Ga. Spid. Ins. Apt., II, p. 321. Ga.

T. partitum Walck. *Ibid.*, p. 323. Ga.

T. pascagoulensis Becker. Ann. Soc. Ent. Belgique, XXII, p. 80, pl. 1, fig. 10. Miss.

T. pertenne Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 283. *Id.*, Spid. U. S., ed. Burgess, p. 155, pl. 17, fig. 6. Ala.

T. pictipes Keyserling. Die Spinn. Am., Therid., I, p. 64, fig. 38. Fla.

T. placens Keyserling. *Ibid.*, p. 71, fig. 43. Wash.

T. pullulum Hentz=*Pholcus pullulus.*

T. punctosparsum Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 12, pl. 1, fig. 6. N. Eng., Colo., D. C., Va., Fla.

——— Keyserling. Die Spinn. Am., Therid., I, p. 14, fig. 3.

T. quadripunctatum Walck. Abbot Ga. Spid. Ins. Apt., II, p. 293. Ga.

——— Blackw. Spid. fr. Canada. Ann. and Mag. of Nat. Hist., XVII, p. 76. Canada.

T. roscidum Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 277. *Id.*, Spid. U. S., ed. Burgess, p. 149, pl. 16, figs. 15, 16. Ala., Mass.

T. rupicola Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 14, pl. 2, fig. 2. Mass., Conn.

T. serpentinum Hentz =*Teutana triangulosa.*

T. sexpunctatum Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 12, pl. 2, fig. 5. Mass., N. H.

T. sisyphoides Walck. Abbot Ga. Spid. Ins. Apt., II, p. 321. Ga.

***T. sisyphum** Walck. Blackw. Spid. fr. Canada. Ann. and Mag. of Nat. Hist., XVII, p. 77. Canada.

T. sphærula Hentz=*Theridula sphærula.*

T. spirale Emerton. N. Eng. Therid. Trans. Conn. Ac., VI, p. 10, pl. 1, fig. 2. Mass., Conn., Md., Va., D. C., Pa., Lake Superior.

——— Keyserling. Die Spinn. Am., Therid., I, p. 56, fig. 33.

T. studiosum Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 274. *Id.*, Spid. U. S., ed. Burgess, p. 145, pl. 16, fig. 5. Ala., S. C., Miss., D. C., Va., Pa., N. J.

——— Keyserling. Die Spinn. Am., Therid., I, p. 20, fig. 7.

T. sublatum Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 276. *Id.*, Spid. U. S., ed. Burgess, p. 147, pl. 16, fig. 10. Ala.

***T. tepidariorum** C. Koch. Die Arachn., VIII, p. 75, figs. 647, 648. U. S.

tepidariorum Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 13, pl. 2, fig. 1.

tepidatorium Keyserling. Die Spinn. Am., Therid., I, p. 9, fig. 1.

vulgare Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 271. *Id.*, Spid. U. S., ed. Burgess, p. 142, pl. 16, fig. 1.

T. trigonum Hentz=*Argyrodes argyrodes.*

T. unimaculatum Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 15, pl. 2, fig. 4. Mass., Conn., Pa., Md., D. C., Fla.

——— Keyserling. Die Spinn. Am., Therid., I, p. 40, fig. 21.

T. ventillans Keyserling. *Ibid.*, p. 84, fig. 53. Fla.

T. verecundum Hentz=*Lathrodectus mactans.*

T. zelotypum Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 11, pl. 1, fig. 4.

——— Keyserling. Die Spinn. Am. Therid., I, p. 25, fig. 10.

GAUCELMUS.

Keyserling. Die Spinn. Am., Therid., I, p. 99. 1884.

G. augustinus Keyserling. *Ibid.*, p. 99, fig. 65. Fla.

ACHÆA.

Cambridge. Proc. Lond. Zool. Soc., p. 428. 1882.

1884. Keyserling. Die Spinn. Am., Therid., I, p. 100.

***A. ignota** Keyserling. *Ibid.*, p. 112, fig. 73. D. C.

STEATODA.

Sundevall. Conspect. Arachn., p. 16 ad part. 1833.

1836. *Eucharia* C. Koch. Herr-Schaeff. Deutchl. Ins., 134, 8–11.
1837. *Eucharia* C. Koch. Uebers d. Arachn., Syst., I, p. 7.
1869. *Eucharia* Menge. Preuss. Spinn., p. 260.
1882. *Steatoda* Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 18 ad part.
1884. *Steatoda* Keyserling. Die Spinn. Am., Therid., I, p. 114.

S. borealis Hentz (*Theridium*). Journ. Bost. Soc. Nat. Hist., VI, p. 274. *Id.*, Spid. U. S., ed. Burgess, p. 145, pl. 16, fig. 4. U. S.
——— Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 19, pl. 4, fig. 1.
——— Keyserling. Die Spinn. Am. Therid., I, p. 119, fig. 77.
S. corollata Emerton=*Lithyphantes corollatus.*
S. guttata Emerton=*Crustulina sticta.*
S. marmorata Emerton=*Lithyphantes marmoratus.*
S. nigra Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 21, pl. 4, fig. 4. Mass., D. C.
S. triangulosa Emerton=*Teutana triangulosa.*

TEUTANA.

Simon. Arachn. de France, V, p. 161. 1881.

1884. Keyserling. Die Spinn. Am. Therid., I, p. 121.

***T. triangulosa** Walck. Faune Paris, II, p. 207.
——— Keyserling. Die Spinn. Am. Therid., I, p. 122, fig. 78.
Theridium triangulifer Walck. Ins. Apt., II, p. 324.
Theridium venustissima C. Koch. Die Arachn., IV, p. 114, fig. 322.
Theridium serpentinum Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 273. *Id.* Spid. U. S., ed. Burgess, p. 144, pl. 16, fig. 2.
Steatoda triangulosa Emerton. N. Engl. Therid. Trans. Conn, Ac., VI, p. 22.

NESTICUS.

Thorell. On Europ. Spid., p. 88. 1869.

N. carteri Emerton. Spid. fr. caves in Ky., Va. and Ind. Am. Natural., IX, p. 279, pl. 1, fig. 28. Ky.
N. pallidus Emerton. *Ibid.*, p. 279, pl. 1, figs. 22–27. Va.

LITHYPHANTES.

Thorell. On Europ. Spid., p. 94. 1869.

1882. *Steatoda* Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 21 **ad part.**
1884. *Lithyphantes* Keyserling. Die Spinn. Am., Therid., I, p. 128.

*L. **corollatus** Linn. (*Aranea*). Syst. Nat. Ed., X, I, p. 621 Mass., N. Y., Colo., Pa., Utah, Dak., Lake Superior.
——— Thorell. Bull. U. S. Geol. Surv. Terr., III, No. 2, p. 487.
——— Keyserling. Die Spinn. Am., Therid., I, p. 129, fig. 81.
Theridium maculatum Walck. Tabl. d'Aran., p. 74.
Theridium albomaculatum Hahn. Die Arachn., I, p. 79, fig. 59.
Phrurolithus corollatus C. Koch. *Ibid.*, VI, p. 100, figs. 504–505.
Eucharia albomaculata Menge. Preuss. Spinn., p. 264, tab. 155.
Steatoda corollata Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 21, pl. 4, fig. 5.
L. **fulvus** Keyserling. Die Spinn. Am., Therid., I, p. 142, fig. 89. Utah, Tex.
L. **marmoratus** Hentz (*Theridium*). Journ. Bost. Soc. Nat. Hist., VI, p. 273. *Id.*, Spid. U. S., ed. Burgess, p. 144, pl. 16, fig. 3. Ala., Mass., Pa., Va., D. C., Md., Colo.
——— Keyserling. Die Spinn. Am., Therid., I, p. 136, fig. 84.
L. tectus Keyserling. *Ibid.*, p. 138, fig. 86.
Steatoda marmorata Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 20, pl. 4, fig. 3.
L. **pulcher** Keyserling. Die Spinn. Am., Therid., I, p, 137, fig. 85. Wash.
L. **septemmaculatus** Keyserling. *Ibid.*, p. 141, fig. 88. Colo., Fla.
L. tectus Keyserling = male of *marmoratus*.

LATHRODECTUS.

Walck. Tabl. d'Aran., p. 81. 1805.

1884. Keyserling. Die Spinn. Am., Therid., I, p. 144.

*L. **mactans** Fabr. Entom. Syst., II, p. 410. Pa., Ohio, Colo., Utah, Southern States.
——— Walck. Ins. Apt., I, p. 648.
——— Keyserling. Die Spinn. Am., Therid., p. 145, fig. 91.
formidabilis Walck. Ins. Apt., I, p. 647.
variolus Walck. *Ibid.*, p. 647.
dotatus C. Koch. Die Arachn., VIII, p. 115, fig. 683.
mactans C. Koch. *Ibid.*, p. 115, fig. 682.
Theridium verecundum Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 280. *Id.*, Spid. U. S., ed. Burgess, p. 153, pl. 17, figs. 1, 2.
Theridium lineatum Hentz. *Ibid.*, p. 281. *Id.*, *ibid.*, p. 154, pl. 17, fig. 3.
Tetragnatha zorilla Walck. (Bosc. MSS.). Ins. Apt., II, p. 221.
*L. **geometricus** Keyserling. Die Spinn. Am. Therid., I, p. 148, fig. 92. Cal.

CHRYSSO.

Cambridge. Proc. Lond. Zool. Soc., p. 429. 1882.

1884. Keyserling. Die Spinn. Am., Therid., I, p. 150.

L. albomaculata Cambridge. Proc. Lond. Zool. Soc., p. 429, pl. 30, fig. 6. Fla., Ga., Ariz.

——— Keyserling. Die Spinn. Am., Therid., I, p. 152, fig. 94.

HILDBOLDA.

Keyserling. Die Spinn. Am., Therid., I, p. 157. 1884.

H. simonii Keyserling. *Ibid.*, p. 157, fig. 97. Mass.

ARIAMNES.

Thorell. On Europ. Spid., p. 37. 1869.

1857. *Ariadne* Doleschall. Bijdr. t. d. Kenn. d. Arachn.
1872. *Romphæa* L. Koch. Die Arachn. Austral., p. 289.
1882. *Argyrodes* Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 24 ad part.
1884. *Ariamnes* Keyserling. Die Spinn. Am., Therid., I, p. 167.

A. fictilium Hentz (*Theridium*). Journ. Bost. Soc. Nat. Hist., VI, p. 282. *Id.*, Spid. U. S., ed. Burgess, p. 155, pl. 17, fig. 4. Mass., D. C., Va., Fla.

——— Keyserling. Die Spinn. Am., Therid., I, p. 170.

Argyrodes fictilium Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 24, pl. 5, fig. 2.

SPINTHARUS.

Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 156. 1850.

1875. *Id.* Spid. U. S., ed. Burgess, p. 156.
1882. Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 28.
1884. Keyserling. Die Spinn. Am., Therid., I, p. 176.

S. flavidus *Hentz.* Journ. Bost. Soc. Nat. Hist., VI, p. 284. *Id.*, Spid. U. S., ed. Burgess, p. 157, pl. 17, fig. 8. Ala., Fla., Va., D. C., Md., Pa., N. Y., Mass., Conn.

——— Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 28, pl. 5, fig. 2.

——— Keyserling. Die Spinn. Am., Therid., I, p. 176, fig. 107.

ARGYRODES.

Simon. Hist. Nat. d'Araign., p. 253. 1864.

1882. Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 23.
1884. Keyserling. Die Spinn. Am., Therid., I, p. 179.
1881. *Conopistha* Karsch. Diagn. Arachn. Japon. Berl. Ent. Zeitschr., XXV, p. 39.

***A. argyrodes** Walck (*Linyphia*). Abbot Ga. Spid. Ins. Apt., II, p. 282. Me., Conn., N. Y., D. C., Va., S. C., Fla.

——— Keyserling. Die Spinn. Am., Therid., I, p. 181, fig. 109.

Theridium trigonum Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 280. *Id.*, Spid. U. S., ed. Burgess, p. 152, pl. 16, figs. 24, 25, pl. 19, figs. 117, 131, pl. 21, fig. 14.

Argyrodes trigonum Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 23, pl. 5, fig. 1.

A. cancellatus Hentz (*Theridium*). Journ. Bost. Soc. Nat. Hist., VI, p. 278. *Id.*, Spid. U. S., ed. Burgess, p. 149, pl. 16, figs. 17, 18. Ala., D. C., Conn.

——— Keyserling. Die Spinn. Am., Therid., II, p. 243, fig. 297.

Lasseola cancellata Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 26, pl. 5, fig. 4.

A. globosus Keyserling. Die Spinn. Am., Therid., I, p. 204, fig. 123. Fla.

A. larvatus Keyserling. *Ibid.*, p. 197, fig. 118. Texas.

A. montanus Keyserling. *Ibid.*, p. 193, fig. 115. D. C., Va.

***A. nephilæ** Taczanowski. Hor. Soc. Ent. Rossicæ, X, 51. Fla., Ala., La.
——— Keyserling. Die Spinn. Am., Therid., I, p. 184, fig. 110.

A. trigonum Emerton = *argyrodes*.

A. trituberculatas Becker. Ann. Soc. Ent. Belgique, XXII, p. 79. pl. 1, figs. 1, 2, 3. Miss.
——— Keyserling. Die Spinn. Am., Therid., I, p. 203, fig. 122.

EPISINUS.

Latreille. Gen. Crust. et Insect., IV, p. 371. 1809.

1884. Keyserling. Die Spinn. Am., Therid., I, p. 205.

***E. truncatus** Walck. Latr. Gen. Crust. et Ins., IV, p. 371. D. C., Va.
——— Keyserling. Die Spinn. Am., Therid., I, p. 209.
Theridium angulatum Blackw. Spid. of Gr. Brit., II, p. 202, pl. 15, fig. 133.

COLEOSOMA.

Cambridge. Proc. Lond. Zool. Soc., p. 426. 1882.

1884. Keyserling. Die Spinn. Am., Therid., I, p. 211.

***C. blandum** Cambridge. Proc. Lond. Zool. Soc., 1882, p. 427, pl. 29, fig. 3. Fla.
——— Keyserling. Die Spinn. Am., Therid., I, p. 212, fig. 127.

BELLINDA.

Keyserling. Die Spinn. Am., Therid., I, p. 216. 1884.

B. cancellata Keyserling. *Ibid.*, p. 216, fig. 130. Fla.

ASAGENA.

Sundevall. Conspect. Arachn., p. 19. 1833.

1882. Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 22.
1884. Keyserling. Die Spinn. Am., Therid., II, p. 1.

A. americana Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 23, pl. 6, fig. 6. D. C., Va., Md., Pa., N. Y., Mass., Conn.
——— Keyserling. Die Spinn. Am., Therid., II, p. 2, fig. 135.

MIMETUS.

Hentz. Am. Journ. of Sci. and Arts, XXI, p. 104. 1832.

1850. Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 31.
1875. Hentz. Spid. U. S., ed. Burgess, p. 137.
1881. Simon. Arachn. d. France, V, p. 28.
1882. Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 16.
1886. Keyserling. Die Spinn. Am., Therid., II, p. 5.
1870. *Ctenophora* Blackw. Ann. and Mag. of Nat. Hist, V, p. 401.

M. epeiroides Emerton = *interfector*.

M. interfector Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 32. *Id.*, Spid. U. S., ed. Burgess, p. 138, pl. 15, figs. 12, 13. D. C., Fla., Tex., Ala., Utah, N. Y., Mass., Conn., Pa., Md.
——— Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 16, pl. 3, fig. 3.
——— Keyserling. Die Spinn. Am., Therid., II, p. 7, fig. 137.
epeiroides Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 17, pl. 3, fig. 4.
tuberosus Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 34. *Id.*, Spid. U. S., ed. Burgess, p. 139, pl. 15, fig. 14.

M. syllepsicus Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 34. *Id.*, Spid. U. S., ed. Burgess, p. 140, pl. 15, fig. 15.

M. tuberosus Hentz = *interfector.*

ERO.

C. Koch. Uebers. d. Arachn. Syst., I, p. 8. 1837.

1882. Emerton. N. Engl. Therid. Trans. Conn, Ac., VI, p. 17.
1886. Keyserling. Die Spinn. Am., Therid., II, p. 12.

***E. furcata** Villers (*Aranea*). Car. Lin. Ent., IV, p. 129. Mass., Conn.
——— Keyserling. Die Spinn. Am., Therid., II, p. 13, fig. 140.
Ero variegata C. Koch. Herr-Schaeff. Deutschl. Ins., 138, 5, 6.
Theridium variegatum Walck. Ins. Apt., II, p. 332.
Theridium leoninum Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 276.
Theridium variegatum Blackw. Spid. of Gr. Brit., II, p. 203, pl. 15, fig. 134.
Ero variegata Menge. Preuss. Spinn., p. 147, pl. 28, tab. 61.
Ero thoracica Thorell. On Europ. Spid., p. 77.
Ero thoracica Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 18, pl. 3, fig. 5.

THERIDULA.

Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 25. 1882.

1886. Keyserling. Die Spinn. Am., Therid., II, p. 29.

T. quadripunctata Keyserling. *Ibid.*, p. 32, fig. 151. Fla.

T. sphærula Hentz (*Theridium*). Journ. Bost. Soc. Nat. Hist., VI, p. 279. *Id.*, Spid. U. S., ed. Burgess, p. 151, pl. 16, fig. 22. Ga., Pa., D. C., Va., N. Engl.
——— Emerton. N. Engl. Therid. Trans. Conn., Ac., VI, p. 25, pl. 5, fig. 3.
——— Keyserling. Die Spinn. Am., Therid., II, p. 33, fig. 152.

ULESANIS.

L. Koch. Die Arachn. Austral., p. 242. 1872.

1873. *Oroodes* Simon. Mem. Soc. R. Sc. Liege, p. 128.
1873. *Stegosoma.* Cambr. Proc. Lond. Zool. Soc., p. 127.
1879. *Sudabe.* Karsch. Verh. d. Nat. Ver. d. Rheinl., p. 103.
1882. *Ulesanis* Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 28.
1886. *Ulesanis* Keyserling. Die Spinn. Am. Therid., II, p. 16.

U. americana Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 28, pl. 6, fig. 1. Ga., Fla., D. C., Mass., Conn.
——— Keyserling. Die Spinn. Am., Therid., II, p. 17, fig. 142.

CRUSTULINA.

Menge. Preuss. Spinn., p. 168. 1868.

1886. Keyserling. Die Spinn. Am., Therid., ii, p. 36.
1882. *Steatoda* Emerton. N. Engl. Therid. Trans. Conn. Ac., vi, p. 20 ad part.

***C. sticta** Cambridge (*Theridion*). Ann. and Mag. Nat. Hist., vii, 1861, p. 432. Mass., Pa., D. C., Md., Va.
—— Keyserling. Die Spinn. Am., Therid., ii, p. 37, fig. 154.
Theridium stictum Blackw. Spid. Gr. Brit., ii, p. 196, pl. 14, fig. 126.
Steatoda guttata Emerton. N. Engl. Therid. Trans. Conn. Ac., vi, p. 20, pl. 4, fig. 2.

DIPŒNA.

Thorell. On Europ. Spid., p. 91. 1869.

1868. *Pachydactylus* Menge. Preuss. Spinn., p. 176.
1881. *Lasæola* Simon. Arachn. d. France, v, p. 136.
1886. *Dipœna* Keyserling. Die Spinn. Am., Therid., ii, p. 40.

D. buccalis Keyserling. *Ibid.*, p. 42, fig. 157. Pa., Va., N. Y.
D. crassiventris Keyserling. *Ibid.*, p. 41, fig. 156. Ga.

EURYOPIS.

Menge. Preuss. Spinn., p. 174. 1868.

1882. Emerton. N. Engl. Therid. Trans. Conn. Ac., vi, p. 26.
1886. Keyserling. Die Spinn. Am., Therid., ii, p. 46.

E. argentea Emerton. N. Engl. Therid. Trans. Conn. Ac., vi, p. 27, pl. 5. fig. 5. Fla., Conn.
—— Keyserling. Die Spinn. Am., Therid., ii, p. 50, fig. 162.
E. funebris Hentz (*Theridium*). Journ. Bost. Soc. Nat. Hist., vi, p. 276. *Id.*, Spid. U. S., ed. Burgess, p. 148, pl. 16, fig. 11. Ala., Mass., Conn., Pa., Md., D. C., Va., Utah, N. Mex., Ga., S. C.
—— Emerton. N. Engl. Therid. Trans. Conn. Ac., vi, p. 27, pl. 5, fig. 6.
—— Keyserling. Die Spinn. Am., Therid., ii, p. 49, fig. 161.

LINYPHIA.

Latreille. Nouv. Diction. d'Hist. Nat., xxiv, p. 134. 1804.

1866. *Bathyphantes* Menge. Preuss. Spinn., p. 111.
1866. *Pedina id.* *Ibid.*, p. 125.
1866. *Helophora id.* *Ibid.*, p. 126.
1866. *Stylophora id.* *Ibid.*, p. 128.
1866. *Lepthyphantes id.* *Ibid.*, p. 131.
1866. *Bolyphantes id.* *Ibid.*, p. 134.
1866. *Drapetisca id.* *Ibid.*, p. 140.
1884. *Bolyphantes* Simon. Arachn. de France, v, p. 209.
1884. *Lephthyphantes id.* *Ibid.*, p. 265.
1884. *Bathyphantes id.* *Ibid.*, p. 333.
1882. *Linyphia* Emerton. N. Engl. Therid. Trans. Conn. Ac., vi, p. 60.
1882. *Stemonyphantes id.* *Ibid.*, p. 64.
1882. *Diplostyla id.* *Ibid.*, p. 65.
1882. *Drapetisca id.* *Ibid.*, p. 65.
1882. *Helophora id.* *Ibid.*, p. 67.

1882. *Bathyphantes id.* *Ibid.*, p. 68.
1882. *Bolyphantes id.* *Ibid.*, p. 72.
1886. *Linyphia* Keyserling. Die Spinn. Am., Therid., II, p. 51.

L. alpina Emerton (*Bathyphantes*). N. Engl. Therid. Trans. Conn. Ac., VI, p. 70, pl. 22, fig. 4. N. H.

L. angulata Emerton (*Bathyphantes*). *Ibid.*, p. 71, pl. 22, fig. 5. Conn.

L. arctica Keyserling. Die Spinn. Am., Therid., II, p. 85, fig. 179. Alaska.

L. arcuata Keyserling. *Ibid.*, p. 74, fig. 173. Wash.

L. argyrodes Walck. = *Argyrodes argyrodes.*

L. autumnalis Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 30. *Id.*, Spid. U. S., ed. Burgess, p. 135, pl. 15, fig. 9. Me., Mass.

L. bihamata Emerton (*Bathyphantes*). N. Engl. Therid. Trans. Conn. Ac., VI, p. 72, pl. 13, fig. 4. N. H.

L. brevipes Keyserling. Die Spinn. Am., Therid., II, p. 87, fig. 181. Wash.

*__L. bucculenta__ Clerk (*Araneus*). Sv. Spindl., p. 63, pl. 4, tab. 1. D. C., Mass., Conn., Va.

Aranea lineata Linn. Syst. Nat. Ed., X, 1, p. 620.
Aranea trilineata Linn. Syst. Nat. Ed., XII, 1, p. 1031.
Theridium reticulatum Hahn. Die Arachn., II, p. 39, fig. 124.
Linyphia reticulata Walck. Ins. Apt., II, p. 260.
Bolyphantes trilineatus C. Koch. Die Arachn., VIII, p. 67, fig. 641.
Nerienne trilineata Blackw. Spid. of Gr. Brit., II, p. 279, fig. 193.
Stemonyphantes trilineatus Menge. Preuss. Spinn., p. 139, tab. 58.
Stemonyphantes bucculentus Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 64, pl. 20, fig. 1.
Linyphia lineata Keyserling. Die Spinn. Am., Therid., II, p. 64, fig. 167.

L. canadensis Emerton (*Diplostyla*). N. Engl. Therid. Trans. Conn. Ac., VI, p. 66, pl. 21, fig. 1. Canada.

L. clathrata Sundwall = *Frontina clathrata.*

L. coccinea Hentz = *Frontina coccinea.*

L. communis Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 28. *Id.*, Spid. U. S., ed. Burgess, p. 132, pl. 15, fig. 4. U. S.
——— Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 62, pl. 8, fig. 2.
——— Keyserling. Die Spinn. Am., Therid., II, p. 78, fig. 175.

L. complicata Emerton (*Bathyphantes*). N. Engl. Therid. Trans. Conn. Ac., VI, p. 72, pl. 24, fig. 8. N. H.

*__L. concolor__ Reuss. Zool. Misc. Arachn., p. 261, pl. 18, fig. 3. D. C., Mass., Conn., Canada.
——— Keyserling. Die Spinn. Am., Therid., II, p. 81, fig. 177.

Theridium filipes Blackw. Spid. of Gr. Brit., II, p, 206, pl. 16, fig. 136.
Stylophora concolor Menge. Preuss. Spinn., p. 128, pl. 24, tab. 51.
Diplostyla concolor Emerton. N. Eng. Therid. Trans. Conn. Ac., VI, p. 66, pl. 20, fig. 3.
Bathyphantes concolor Simon. Arachn. d. France, V, p. 336.

L. conferta Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 30. *Id.*, Spid. U. S., ed. Burgess, p. 135, pl. 15, fig. 7. Ala.

L. costata Hentz = *phrygiana.*

L. digna Keyserling. Die Spinn. Am., Therid., II, p. 68, fig. 169. Wash., Cal.

L. drassoides Emerton (*Bolyphantes*). N. Engl. Therid. Trans. Conn. Ac., VI, p. 72, pl. 23, fig. 5. Conn.

L. emertonii Thorell. Spid. fr. Labrador. Proc. Bost. Soc. Nat. Hist., XVII, p. 494. Labrador.

L. fructuosa Keyserling. Die Spinn. Am., Therid., II, p. 72, fig. 171. Utah.

L. galbea Keyserling. *Ibid.*, p. 83, fig. 178. Ga., D. C.

L. grandæva Keyserling. *Ibid.*, p. 92, fig. 185. Pa.

L. incerta Emerton = *Willibaldia incerta.*

*L. **insignis** Blackw. Linn. Trans, XVIII, p. 662. Pa., Mass.

——— Keyserling. Die Spinn. Am., Therid., II, p. 80, fig. 176.

Helophora pallescens Menge. Preuss. Spinn., p. 227, tab. 50.

Helophora insignis Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 67, pl. 21, fig. 3.

L. lemniscata Walck. Abbot Ga. Spid. Ins. Apt., II, p. 263. Ga.

L. lineata Keyserling (Linn) = *bucculenta.*

L. litigiosa Keyserling. Die Spinn Am., Therid., II, p. 62, fig. 166. Wash.

L. mandibulata Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 64, pl. 19, fig. 2. Me., N. H., Mass., N. Y., Pa., Md., D. C., Va., Lake Superior.

*L. **marginata** C. Koch. Herr-Schaeff. Deutschl. Ins., 127, 21, 22.

——— Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 61, pl. 18, fig. 1.

——— Keyserling. Die Spinn. Am., Therid., II, p. 58, fig. 164.

Araneus triangularis Clerk. Sv. Spindl., p. 71 ad partem, pl. 3, table 2.

Linyphia triangularis Walck. Ins. Apt., II, p. 140.

Linyphia marginata C. Koch. Die Arachn., XII, p. 118, figs. 1041, 1042.

Linyphia marmorata Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 29. *Id.*, Spid. U. S., ed. Burgess, p. 133, pl. 15, fig. 5.

Linyphia scripta Hentz. *Ibid.*, p. 24. *Id.*, *ibid.*, p. 134, pl. 15, fig. 6.

Linyphia triangularis Blackw. Spid. of Gr. Brit., II, p. 212, fig. 139.

L. marmorata Hentz=*marginata.*

L. micaria Emerton (*Bathyphantes*). N. Engl. Therid. Trans. Conn. Ac., VI, p. 71, pl. 22, fig. 6. Conn.

*L. **minuta** Blackw. Charact. of s. undescr. gen., etc. Lond. and Edinb. Phil. Mag., 3 Ser., III, p. 191. Mass.

Leptyphantes musciola Menge. Preuss. Spinn., p. 133, pl. 25, tab. 54.

Bathyphantes minuta Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 68, pl. 21, fig. 4.

*L. **nebulosa** Sundevall. Sv. Spindl. Bescr. in Vet. Akad. Handl., 1829, p. 218. Ga., D. C., Mass., Conn.

——— Keyserling. Die Spinn. Am., Therid., II, p. 75, fig. 174.

furcula C. Koch. Die Arachn., XII, p. 116, fig. 1040.

circumflexa C. Koch. *Ibid.*, p. 128, fig. 1050.

vivax Blackw. Spid. of Gr. Brit., II, p. 221, fig. 146.

Lepthyphantes crypticola Menge. Preuss. Spinn., p. 133, pl. 25, tab. 54.

Lepthyphantes nebulosa Thorell. On synonyms, p. 54.

Bathyphantes nebulosus Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 69, pl. 22, fig. 1.

Lepthyphantes nebulosus Simon. Arachn. d. France, V, p. 273.

L. neophita Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 31. *Id.*, Spid. U. S., ed. Burgess, p. 136, pl. 15, fig. 10. N. C.

*L. **nigrina** Westring. Foerteckn., etc., p. 38, 1851. N. H., Mass., R. I., Md., D. C.

pulla Blackw. Spid. of Gr. Brit., II, p. 234, fig. 156.

Bathyphantes terricolus Menge. Preuss. Spinn., p. 112, pl. 19, tab. 38.

Diplostyla nigrina Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 65, pl. 20, fig. 2.

L. orophila Thorell. Bullet. U. S. Geol. Surv. Terr., III, No. 2, p. 480. Col.

*L. **phrygiana** C. Koch. Die Arachn., III, p. 83, figs. 229, 230. N. Engl., Atlantic, Middle, and Southern States.

——— Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 63, pl. 19, fig. 1.

——— Keyserling. Die Spinn. Am., Therid., II, p. 60, fig. 164.

costata Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 31. *Id.*, Spid. U. S., ed. Burgess, p. 136, pl. 15, fig. 11.

***L. pusilla** Sundevall. Sv. Spindl. Bescr. Vet. Akad. Handl., 1829, p. 214.
——— Keyserling. Die Spinn. Am., Therid., II, p. 55, fig. 163.
Theridium signatum Hahn. Die Arachn., II, p. 40, fig. 125.
Theridium ampulaceum Walck. Ins. Apt., II, p. 336.
Linyphia fuliginea Blackw. Spid. of Gr. Brit., II, p. 216, fig. 142.

L. pyramidea Walck. Abbot Ga. Spid. Ins. Apt., II, p. 261. Ga.

L. radiata Walck. *Ibid.*, p. 262. Ga.

L. reducta Keyserling. Die Spinn. Am., Therid., II, p. 73, fig. 172. Wash.

L. rufa Walck. Abbot Ga. Spid. Ins. Apt., II, p. 284. Ga.

L. rubrofasciata Keyserling. Die Spinn. Am., Therid., II, p. 66, fig. 168. Wash.

L. sabulosa Keyserling. *Ibid.*, p. 70, fig. 170. Utah.

L. scripta Hentz = *marginata.*

L. sitkæensis Keyserling. Die Spinn. Am., Therid., II, p. 86, fig. 180. Alaska.

***L. socialis** Sundevall. Sv. Spindlar Bescr. Vet. Akad. Handl., 1832, p. 260. N. H., Mass., D. C.
annulipes Blackw. Charact. of s. undescr. gen., etc., p. 348.
tigrina Reuss. Zool. Misc. Arachn., p. 256, pl. 17, fig. 11.
sepium C. Koch. Uebers d. Arachn. Syst., I, p. 10.
bucculenta Walck. Ins. Apt., II, p. 274.
Meta tigrina C. Koch. Die Arachn., VIII, p. 130, figs. 1051, 1052.
Linyphia socialis Blackw. Spid. of Gr. Brit., II, p. 222, fig. 147.
Drapetisca socialis Menge. Preuss. Spid., p. 141, pl. 27, tab. 59.
Drapetisca socialis Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 67, pl. 21, fig. 2.

L. subalpina Emerton (*Bathyphantes*). N. Engl. Therid. Trans. Conn. Ac., VI, p. 70, pl. 22, fig. 3. N. H.

L. subterranea Emerton = *Phanetta subterranea.*

L. textrix Walck. Abbot Ga. Spid. Ins. Apt., II, p. 281. Ga.

L. weyeri Emerton. Spid. fr. Caves in Ky., Va., Ind. Am. Natural., IX, p. 279, pl. 1, figs. 7-12. Va.
——— Packard. The Cave Fauna of N. A. Nation. Ac. Sc., IV, mem. 1, p. 57.

L. zebra Emerton (*Bathyphantes*). N. Engl. Therid. Trans. Conn. Ac., VI, p. 69, pl. 22, fig. 2. Mass., Conn.

Stemonyphantes Menge = *Linyphia.*

Preuss. Spinn., 138, 1866.

S. bucculentus (Clerk.) Emerton = *Linyphia bucculenta.*

Diplostila Emerton = *Linyphia.*

N. Engl. Therid. Trans. Conn. Ac., VI, p. 65.

D. canadensis Emerton = *Linyphia canadensis.*
D. concolor (Reuss.) Emerton = *Linyphia concolor.*
D. nigrina (Westr.) Emerton = *Linyphia nigrina.*

Drapetisca Menge = *Linyphia.*

Preuss. Spinn., p. 140.

D. socialis (Menge) Emerton = *Linyphia socialis.*

Helophora Menge = *Linyphia.*

Preuss. Spinn., p. 127.

H. insignis (Blackw.) Emerton = *Linyphia insignis.*

Bolyphantes C. Koch = *Linyphia.*

Uebers. d. Arachn. Syst., I, p. 9.

B. drassoides Emerton = *Linyphia drassoides.*

Bathyphantes Menge = *Linyphia.*

Preuss. Spinn., p. 111.

B. alpina Emerton = *Linyphia alpina.*
B. angulata id. =*Linyphia angulata.*
B. bihamata id. = *Linyphia bihamata.*
B. complicata id. = *Linyphia complicata.*
B. formica id. = *Erigone formica.*
B. micaria id. = *Linyphia micaria.*
B. minuta (Blackw.) Emerton = *Linyphia minuta.*
B. nebulosa (Sund.) Emerton = *Linyphia nebulosa.*
B. subalpina Emerton = *Linyphia subalpina.*
B. zebra Emerton = *Linyphia zebra.*

LABULLA.

Simon. Arachn. de France, v, p 261. 1884.

1886. Keyserling. Die Spinn. Am., Therid., II, p. 93.

L. altioculata Keyserling. *Ibid.*, p. 94, fig. 186. Wash.

FRONTINA.

Simon. Arachn. de France, v, p. 206. 1884.

1886. Keyserling. Die Spinn. Am., Therid., II, p. 96.

F. adstricta Keyserling. *Ibid.*, p. 116, fig. 199. Utah.
***F. clathrata** Sundevall (*Linyphia*). Sv. Spindl. Beser. Vet. Akad. Handl., 1829, p. 218.
—— Keyserling. Die Spinn. Am., Therid., II, p. 98, fig. 187.
Linyphia luctuosa C. Koch. Die Arachn., XII, p. 111, fig. 1037.
Nerienne marginata Blackw. Spid. of Gr. Brit., II, p. 299, fig. 167.
Linyphia clathratra Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 62, pl. 18, fig. 3.
F. coccinea Hentz (*Linyphia*). Journ. Bost. Soc. Nat. Hist., VI, p. 30. *Id.*, Spid. U. S., ed. Burgess, p. 135, pl. 15, fig. 8. Mass., D. C., Va., Ill., Pa.
—— Keyserling. Die Spinn. Am., Therid., II, p. 100, fig. 188.

ANTROBIA.

Tellkampf. Wiegm. Archiv. f. Nat. Gesch., p. 318. 1884.

1875. Emerton. Notes on Spid. fr. caves, etc. Am. Natural., IX, p. 278.
1886. Keyserling. Die Spinn. Am., Therid., II, p. 121.

A. mammouthia Tellkampf. Wiegm. Arch. f. Nat. Gesch., 1884, p. 318, pl. 8, figs. 13–17. Mam. Cave, Ky.
——— Emerton. Spid. fr. caves in Ky., Va. and Ind. Am. Natural., IX, p. 280, pl. 1, figs. 1–6.
——— Keyserling. Die Spinn. Am., Therid., II, p. 122, fig. 203.
——— Packard. The cave fauna of N. A. Nation. Ac. Sc., IV, mem. 1, p. 58.

WILLIBALDIA.

Keyserling. Die Spinn. Am., Therid., II, p. 122. 1886.

W. cavernicola Keyserling. *Ibid.*, p. 123, fig. 204. Reynolds' cave, Ky.
W. incerta Emerton (*Linyphia*). Spid. fr. caves in Ky., Va., and Ind. Am. Nat., IX, p. 280, pl. 1, figs. 13–21.
——— Packard. Cave fauna of N. A. Nation. Ac. Sc., IV, mem. 1, p. 57.

PHANETTA.

Keyserling. Die Spinn. Am., Therid., II, p. 124. 1886.

P. subterranea Emerton (*Linyphia*). Spid. fr. caves in Ky., Va., and Ind. Am. Natural., IX, p. 279, pl. 1, figs. 29–31. Ky. caves.
——— Keyserling. Die Spinn. Am., Therid., II, p. 125, fig. 205.
——— Packard. The cave fauna of N. Am. National Ac. Sc., IV, mem. 1, p. 57.

PEDANOSTETHUS.

Simon. Archn. de France, V, p. 195. 1884.

1886. Keyserling. Die Spinn. Am., Therid., II, p. 126.
1866. *Ctenium* Menge Preuss. Spinn., p. 292.

P. lividus Blackw. (*Nerienne*). Lond. and Edinb. Phil. Mag., 3, ser. VIII, p. 468. Alaska.
***P. lividus** Blackw. Spid. of Gr. Brit., II, p. 486, fig. 169.
——— Keyserling. Die Spinn. Am., Therid., II, p. 126, fig. 206.
Erigone livida Thorell. On Synonyms, p. 131.
Erigone truncorum L. Koch. Beitr. z. Arachn. Fauna Tyrols., II, p. 261.
P. riparius Keyserling. Die Spinn. Am., Therid., II, p. 265, fig. 313. Lake Superior.

SATILATLAS.

Keyserling. Die Spinn. Am., Therid., II, p. 127. 1886.

S. marxii Keyserling. *Ibid.*, p. 127, fig. 207. Alaska.

PHOLCOMMA (Note 13).

Thorell. On Europ. Spid., p. 98. 1869.

1882. Emerton. N. Eng. Therid. Trans. Conn. Ac., VI, p. 29.
1881. Simon. Arachn. de France, V, 1, p. 134.

P. hirsutum Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 29, pl. 6, fig. 6. Conn.
P. rostratum Emerton. *Ibid.*, p. 30, pl. 6, fig. 5. Mass.

ERIGONE (Note 14).

Sav. and Aud. Descr. de l'Egypt, ed. 2, XXII, p. 319. 1825–'27.

1882. Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 58.
1886. Keyserling. Die Spinn. Am., Therid., II, p. 134.
1864. *Nerienne* Blackw. Spid. of Gr. Brit., II, p. 248.
1864. *Walkenaera id.* *Ibid.*, p. 289.
1833. *Savignia id.* Char. of S. undescr. gen., etc. Lond. and Edinb. Phil. Mag. No. 3, ser. V, p. 187.
1864. *Micryphantus* Simon. H. Nat. d'Araignées, p. 193.
1867. *Micryphantes* Ohlert. Aran. d. Prov. Preussen, p. 34.
1868. *Tmeticus* Menge. Preuss. Spinn., p. 184.
1868. *Ceratina id.* *Ibid.*, p. 170.
1868. *Platyopsis id.* *Ibid.*, p. 178.
1868. *Gonatium id.* *Ibid*, p. 180.
1868. *Gongylidium id.* *Ibid.*, p. 183.
1868. *Dicymbium id.* *Ibid.*, p. 193.
1868. *Lophocarenum id.* *Ibid.*, p. 198.
1868. *Lophomma id.* *Ibid.*, p. 209.
1868. *Phalops id.* *Ibid.*, p. 218.
1868. *Dicyphus id.* *Ibid.*, p. 221.
1868. *Elaphidium id.* *Ibid.*, p. 224.
1868. *Cornicularia id.* *Ibid.*, p. 226.
1868. *Microneta id.* *Ibid.*, p. 227.
1868. *Micryphantes id.* *Ibid.*, p. 236.
1868. *Leptothryx id.* *Ibid.*, p. 240.
1882. *Ceratinella* Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 32.
1882. *Ceratinopsis id.* *Ibid.*, p. 36.
1882. *Spiropalpus id.* *Ibid.*, p. 39.
1882. *Grammonota id.* *Ibid.*, p. 38.
1882. *Cornicularia* (Menge) *id.* *Ibid.*, p. 40.
1882. *Lophomma* (Menge) *id.* *Ibid.*, p. 43.
1882. *Lophocarenum* (Menge) *id.* *Ibid.*, p. 45.
1882. *Tmeticus* (Menge) *id.* *Ibid.*, p. 52.
1882. *Gonatium* (Menge) *id.* *Ibid.*, p. 60.
1882. *Microneta* (Menge) *id.* *Ibid.*, p. 73.

***E. atra** Blackw. Edinb. Phil. Mag., III, No. 15, p. 195. Mass.
——— Cambridge. N. Erigone fr. N. Am., I. Proc. Lond. Zool. Soc., 1874, p. 429.
E. atriceps Cambridge. *Ibid.*, p. 436, pl. 55, fig. 7. Mass., Conn., D. C., Va.
Ceratinella atriceps Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 34, pl. 7, fig. 5.
E. auranticeps Emerton (*Cornicularia*). *Ibid.*, p. 43, pl. 8, fig. 6. Mass., N. H.
E. autumnalis Emerton. *Ibid.*, p. 58, pl. 17, fig. 8. Mass., Conn., Va., Md., D. C.
——— Keyserling. Die Spinn. Am., Therid., II, p. 171, fig. 232.

E. bidentata Emerton (*Tmeticus*). N. Engl. Therid. Trans. Conn. Ac., VI, p. 56, pl. 17, fig. 2. N. H.

E. bostonensis Emerton (*Tmeticus*). *Ibid.*, p. 56, pl. 17, fig. 1. Mass.

E. brevicornis Emerton (*Cornicularia*). *Ibid.*, p. 42, pl. 11, fig. 5. Conn.

E. brunnea Emerton (*Ceratinella*). *Ibid.*, p. 36, pl. 8, fig. 3. N. H., Mass., Conn.

E. bulbosa Emerton (*Ceratinella*). *Ibid.*, p. 33, pl. 7, fig. 3. Conn.

E. bulbosula Keyserling. Die Spinn. Am., Therid., II, p. 183, fig. 243. Md.

E. cacuminum Thorell. Bullet. U. S. Geol. Surv. Terr., III, No. 2, p. 483. Colo.

E. calcarata Keyserling. Die Spinn. Am., Therid., II, p. 181, fig. 240. Lake Super.

E. castanea Emerton (*Lophocarenum*). N. Engl. Therid. Trans. Conn. Ac., VI, p. 45, pl. 12, fig. 1. Mass.

E. clavicornis Emerton (*Cornicularia*). *Ibid.*, p. 43, pl. 8, fig. 7. N. H.

E. collina Marx. (Note 14.)

Tmeticus montanus Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 55, pl. 16, fig. 3. N. H.

E. coloradensis Keyserling. Die Spinn. Am., Therid., II, p. 163, fig. 230. Colo.

E. communis Emerton (*Cornicularia*). N. Engl. Therid. Trans. Conn. Ac., VI, p. 41, pl. 11, fig. 3. N. H., Mass., Conn.

E. concava Emerton (*Tmeticus*). *Ibid.*, p. 57, pl. 17, fig. 3. Conn.

E. contortus Emerton (*Tmeticus*). *Ibid.*, p. 54, pl. 15, fig. 5. Mass.

E. cornupalpis Cambridge. New Erigone fr. N. A., II. Proc. Lond. Zool. Soc., 1875, p. 401, pl. 46, fig. 8. Mass., Conn.

Microneta cornupalpis Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 74, pl. 23, fig. 2.

E. crassimanus Emerton (*Microneta*). *Ibid.*, p. 75, pl. 24, fig. 3. N. H.

E. crenatum Emerton (*Lophocarenum*). *Ibid.*, p. 51, pl. 14, fig. 7. Mass., Conn.

***E. cristata** Blackw. (*Walkenæra*). Spid. of Gr. Brit., II, p. 309, fig. 224. Mass., Canada.

——— Cambridge. New Erigone fr. N. A., I. Proc. Lond. Zool. Soc.. 1874, p. 438.

Lophomma cristata Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 44, pl. 10, fig. 1. N. H.

E. decemoculata Emerton (*Lophocarenum*). *Ibid.*, p. 46, pl. 12, fig. 4. N. H.

E. dentigera Cambridge. New Erigone fr. N. A., I. Proc. Lond. Zool. Soc., 1874, p. 429. Mass.

——— Cambridge. New Erigone fr. N. A., II. Proc. Zool. Soc., 1875, p. 394, pl. 46, fig. 2.

——— Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 59.

E. depressa Emerton (*Lophocarenum*). *Ibid.*, p. 50, pl. 14, fig. 6. N. H.

E. directa Cambridge. New Erigone fr. N. A., I. Proc. Lond. Zool. Soc., 1874, p. 439, pl. 55, fig. 9. Mass., Conn., D. C., Va.

Cornicularia directa Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 40, pl. 11, fig. 1.

Erigone provida Cambridge. New Erigone fr. N. A., II. Proc. Lond. Zool. Soc., 1875, p. 398, pl. 46, fig. 5.

E. discolor Emerton (*Microneta*). N. Engl. Therid. Trans. Conn. Ac., VI, p. 75, pl. 24, fig. 1. Mass., Conn.

E. elongata Emerton (*Lophomma*). *Ibid.*, p. 44, pl. 10, fig. 2. Mass.

E. emertonii Cambridge. New Erigone fr. N. A., I. Proc. Lond. Zool. Soc., 1874, p. 435, pl. 55, fig. 6.

——— Keyserling. Die Spinn. Am., Therid., II, p. 178, fig. 237.

Ceratinella Emertonii Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 32, pl. 7, fig. 1.

E. erigonoides Emerton (*Lophocarenum*). *Ibid.*, p. 50, pl. 14, fig. 3.

E. fabra Keyserling. Die Spinn. Am., Therid., II, p. 167, fig. 229. Ala., Texas.

E. falsifica Keyserling. *Ibid.*, p. 199, fig. 259. Aleutian Islands, Alaska.

E. famelica Keyserling. *Ibid.*, p. 186, fig. 246. Alaska.

E. famularis Keyserling. *Ibid.*, p. 198, fig. 258. Alaska.

E. famulatoria Keyserling. *Ibid.*, p. 182, fig. 242. Lake Superior.

E. fissiceps Cambridge. New Erigone fr. N. A., I. Proc. Lond. Zool. Soc., 1874, p. 438, pl. 55, fig. 8. Mass., Conn., D. C., Va., Md.

——— Keyserling. Die Spinn. Am., Therid., II, p. 155, fig. 221.

Ceratinella fissiceps Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 33, pl. 7, fig. 2.

E. florens Cambridge. New Erigone fr. N. A., II. Proc. Lond. Zool. Soc., 1875, p. 403, pl. 46, fig. 10. Mass., Conn., Pa., Md., D. C., Va.

——— Keyserling. Die Spinn. Am., Therid., II, p. 158, fig. 223.

Lophocarenum florens Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 46, pl. 12, fig. 3.

E. formica Emerton (*Bathyphantes*). *Ibid.*, p. 71, pl. 22, fig. 7. Conn., D. C.

E. furcata Emerton (*Microneta*). *Ibid.*, p. 76, pl. 24, fig. 5. N. H.

E. fusca Marx (Note 14).

Tmeticus brunneus Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 58, pl. 17, fig. 7.

E. humiliceps Keyserling. Die Spinn. Am., Therid., II, p. 148, fig. 214. D. C.

E. indirecta Cambridge. New Erigone fr. N. A., I. Proc. Lond. Zool. Soc., 1874, p. 440, pl. 55, fig. 10. Mass., D. C.

E. indirecta Keyserling. Die Spinn. Am., Therid., II, p. 146, fig. 213.

Cornicularia indirecta Emerton. N. Engl. Therid. Trans. Conn. Ac, VI, p. 41, pl. 11, fig. 4.

E. infernalis Keyserling. Die Spinn. Am., Therid, II, p. 180, fig. 239. Reynolds' Cave, Ky.

E. inornata Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 39, pl. 10, fig. 5. Conn., Mass.

E. interpres Cambridge. New Erigone fr. N. A., I. Proc. Lond. Zool. Soc., 1874, p. 430, pl. 55, fig. 1. Mass., Conn., D. C., Va., Tex.

——— Keyserling. Die Spinn. Am., Therid., II, p. 144, fig. 212.

Ceratinopsis interpres Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 37, pl. 9, fig. 1.

E. læta Cambridge. N. Erigone fr. N. A., I. Proc. Lond. Zool. Soc., 1874, p. 433, pl. 55, fig. 4. Mass., D. C., Md., Va.

——— Keyserling. Die Spinn. Am., Therid., II, p. 176, fig. 236.

Ceratinella læta Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 35, pl. 8, fig. 1.

E. lætabilis Cambridge. New Erigone fr. N. A., I. Proc. Lond. Zool. Soc., 1874, p. 435, pl. 55, fig. 5. N. H., Mass., Conn.

Ceratinella lætabilis Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 35, pl. 8, fig. 2.

E. lata Emerton (*Lophocarenum*). *Ibid.*, p. 50, pl. 14, fig. 4. Mass.

E. laticeps Emerton (*Ceratinopsis*). *Ibid.*, p. 37, pl. 9, fig. 3. Conn.

E. latidens Emerton (*Microneta*). *Ibid.*, p. 76, pl. 24, fig. 4. Conn.

E. longibulba Emerton (*Microneta*). *Ibid.*, p. 76, pl. 24, fig. 6. Mass.

E. longipalpis Emerton = *simillima* Keyserling.

E. longisetosa Emerton (*Tmeticus*). N. Engl. Therid. Trans. Conn. Ac., VI, p. 54, pl. 16, fig. 1. Conn.

E. longitarsis Emerton (*Lophocarenum*). *Ibid.*, 48, pl. 13, fig. 4. N. H.

E. longituba Emerton (*Lophocarenum*). *Ibid.*, p. 49, pl. 13, fig. 6. N. H.

E. marxii Keyserling. Die Spinn. Am., Therid., II, p. 152, fig. 218. Lake Superior.

E. maxima Emerton (*Tmeticus*). N. Engl. Therid. Trans. Conn. Ac., VI, p. 55, pl. 16, fig. 5. N. H.

E. **micropalpis** Emerton (*Ceratinella*). *Ibid.*, p. 36, pl. 8, fig. 5. Mass.

E. **microtarsis** Emerton (*Tmeticus*). *Ibid.*, p. 57, pl. 17, fig. 4. N. H.

E. **minuta** Emerton (*Ceratinella*). *Ibid*, p. 36, pl. 8, fig. 4. Conn., Mass.

E. **minutissima** Keyserling. Die Spinn. Am., Therid., II, p. 219, fig. 276. Tex.

E. **monoceros** Keyserling. *Ibid.*, p. 156, fig. 222. Wash.

E. **montana** Emerton (*Lophocarenum*). N. Engl. Therid. Trans. Conn. Ac., VI, p. 45, pl. 12, fig. 2. N. H.

E. **monticola** Marx (Note 14).

Tmeticus tibialis Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 56, pl. 16, fig. 6.

E. **montifera** Emerton (*Lophocarenum*). *Ibid.*, p. 47, pl. 13, fig. 2. Mass.

E. **multesima** Cambridge. N. Erigone fr. N. A., II. Proc. Lond Zool. Soc., 1875, p. 402, pl. 46, fig. 9. Mass.

E. **nigriceps** Emerton (*Ceratinopsis*). *Ibid.*, p. 37, pl. 9, fig. 2. Conn., Mass.

E. **nigripalpis** Emerton (*Ceratinopsis*). *Ibid.*, p. 38, pl. 9, fig. 4. Conn.

E. **olivacea** Emerton (*Microneta*). *Ibid.*, p. 77, pl. 24, fig. 7. N. H.

E. **ornata** Cambridge. New Erigone fr. N. A., II. Proc., Lond. Zool. Soc., 1875, p. 395, pl. 46, fig. 3. Mass.

Grammonota ornata Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 39, pl. 10, fig. 3.

E. **pallens** Marx (Note 14).

Lophocarenum pallidum Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 48, pl. 13, fig. 5.

E. **pallescens** Marx (Note 14).

Tmeticus pallidus Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 55, pl. 16, fig. 4.

E. **pallida** Emerton (*Cornicularia*). *Ibid.*, p. 42, pl. 11, fig. 7. Conn.

E. **paullula** Marx (Note 14).

Cornicularia minuta Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 42, pl. 11, fig. 6.

E. **percisa** Keyserling. Die Spinn. Am., Therid., II, p. 153, fig. 219. Md.

E. **perplexa** Keyserling. *Ibid.*, p. 190, fig. 250. Wash.

E. **persimilis** Cambridge. New Erigone fr. N. A., II. Proc. Lond. Zool. Soc., 1875, p. 394, pl. 46, fig. 1. Mass.

E. **persoluta** Cambridge. *Ibid.*, p. 400, pl. 46, fig. 7. Mass., N. H.

Microneta persoluta Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 74, pl. 23, fig. 3.

E. **pertinens** Cambridge. New Erigone fr. N. A., II. Proc. Lond. Zool. Soc., 1875, p. 399, pl. 46, fig. 6. Mass.

Tmeticus pertinens Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 45, pl. 16, fig. 2.

E. **pictilis** Cambridge. New Erigone fr. N. A., II. Proc. Lond. Zool. Soc., 1875, p. 396, pl. 46, fig. 4. New Engl.

——— Keyserling. Die Spinn. Am., Therid., II, p. 194, fig. 254.

Grammonota pictilis Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 38, pl. 10, fig. 4.

E. **plumosa** Emerton (*Tmeticus*). *Ibid.*, p. 53, pl. 15, fig. 3. N. H., Mass., Canada.

E. **polaris** Keyserling. Die Spinn. Am., Therid., II, p. 148, fig. 215. Alaska.

E. **præpulchra** Keyserling. *Ibid.*, p. 172, fig. 233. Aleutian Islands, Alaska (Peru).

E. **probata** Cambridge. New Erigone fr. N. A., I. Proc. Lond. Zool. Soc., 1874, p. 431, pl. 55, fig. 2. Mass., Ky., Conn.

——— Keyserling. Die Spinn. Am., Therid., II, p, 166, fig. 228.

Tmeticus probatus Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 52, pl. 15, fig. 1.

E. provida Cambridge = *directa* ♀.

E. purpurescens Keyserling. Die Spinn. Am., Therid., II, p. 187, fig. 248. Fla., Ga.

E. pygmæa Emerton (*Ceratinella*). N. Engl. Therid. Trans. Conn. Ac., VI, p. 34, pl. 7, fig. 4. Conn.

E. quadricristata Emerton (*Lophocarenum*). *Ibid.*, p. 48, pl. 13, fig. 3. N. H.

E. quinquedentata Emerton (*Microneta*). *Ibid.*, p. 75, pl. 24, fig. 2. Mass., N.H., Canada.

E. relexata Keyserling. Die Spinn. Am., Therid., II, p. 154, fig. 220. Md.

E. rostratula Keyserling. *Ibid.*, p. 186, fig. 247. Md.

E. rostrata Emerton (*Lophocarenum*). N. Engl. Therid. Trans. Conn. Ac., VI, p. 49, pl. 14, fig. 1. Conn.

***E. rubens** Blackw. (*Nerienne*). Spid. of Gr. Brit., II, p. —. N. Engl.

Gonatium rubens Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 60, pl. 23, fig. 6.

E. shumaginensis Keyserling. Die Spinn. Am., Therid., II, p. 182, fig. 241. Aleutian Islands, Alaska.

E. scopulifera Emerton (*Lophocarenum*). N. Engl. Therid. Trans. Conn. Ac., VI, p. 49, pl. 14, fig. 2. Mass.

E. siberiana Keyserling. Die Spinn. Am., Therid., II, p. 189, fig. 249. Commander Island, Siberia.

E. simillima Keyserling. *Ibid.*, p. 170, fig. 231. Aleutian Islands, Alaska.

Longipalpis Emerton *non* Cambridge.

E. simplex Emerton (*Lophocarenum*). N. Engl. Therid. Trans. Conn. Ac., VI, p. 50, pl. 14, fig. 5. Mass.

E. solitaris Keyserling. Die Spinn. Am., Therid., II, p. 179, fig. 238. Cave, Ky.

E. spinifera Cambridge. New Erigone fr. N. A., I. Proc. Lond. Zool. Soc., 1874, p. 432, pl. 55, fig. 3. Mass.

Lophocarenum spiniferum Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 47, pl. 13, fig. 1.

E. spiralis Emerton (*Spiropalpus*). *Ibid.*, p. 39, pl. 10, fig. 6. Mass., Conn.

E. strabo Thorell. Bull. U. S. Geol. Surv. Terr., III, No. 2, p. 483. Colo.

E. terrestris Emerton (*Tmeticus*). N. Engl. Therid. Trans. Conn. Ac., VI, p. 57, pl. 17, fig. 6. Mass.

E. tibialis Emerton (*Cornicularia*). *Ibid.*, p. 41, pl. 11, fig. 2. Mass.

E. tricornis Emerton (*Cornicularia*). *Ibid*,, p. 43, pl. 11, fig. 8. N. H.

E. tridentatus Emerton (*Tmeticus*) *Ibid.*, p. 53, pl. 15, fig. 2. R. I., Conn.

E. trilobatus Emerton (*Tmeticus*). *Ibid.*, p. 53, pl. 15, fig. 4. Mass., Conn.

E. truncatus Emerton (*Tmeticus*). *Ibid.*, p. 57, pl. 17, fig. 5. N. H.

E. ululabilis Keyserling. Die Spinn. Am., Therid., II, p. 184, fig. 244. Alaska.

E. umbraticola Keyserling. *Ibid.*, p. 195, fig. 255. Aleutian Islands, Alaska.

E. umbratilis Keyserling. *Ibid.*, p. 201, fig. 261. N. C.

E. urusta Keyserling. *Ibid.*, p. 193, fig. 253. Aleutian Islands, Alaska.

E. usurpabilis Keyserling. *Ibid.*, p. 193, fig. 252. Aleutian Islands, Alaska.

E. vacerosa Keyserling. *Ibid.*, p. 200, fig. 260. Md., Aleutian Islands, Alaska.

E. vernalis Emerton (*Lophocarenum*). N. Eng. Therid. Trans. Conn. Ac., VI, p. 51, pl. 14, fig. 8. R. I.

***E. viaria** Blackw. (*Nerienne*). Spid. of Gr. Brit., II, p. 255, fig. 171.

——— Cambridge. N. Erigone fr. N. A., II. Proc. Lond. Zool. Soc., 1875, p. 403.

Microneta viaria Emerton. N. Engl. Therid. Trans. Conn. Ac., VI, p. 73, pl. 23, fig. 1.

E. xanthippe Keyserling. Die Spinn Am., Therid., II, p. 192, fig. 251. Ill.

E. zonaria Keyserling. *Ibid.*, p. 196, fig. 256. Ga.

E. zygia Keyserling. *Ibid.*, p. 197, fig. 257. Ga.

Ceratinella Emerton = *Erigone.*

N. Eng. Therid. Trans. Conn. Ac., VI, p. 32.

C. atriceps (Cambr.) Emerton = *Erigone atriceps.*
C. emertonii (Cambr.) Emerton = *Erigone emertonii.*
C. brunnea Emerton = *Erigone brunnea.*
C. bulbosa Emerton = *Erigone bulbosa.*
C. fissiceps (Cambr.) Emerton = *Erigone fissiceps.*
C. læta (Cambr.) Emerton = *Erigone læta.*
C. lætabilis (Cambr.) Emerton = *Erigone lætabilis.*
C. micropalpis Emerton = *Erigone micropalpis.*
C. minuta Emerton = *Erigone minuta.*
C. pygmæa Emerton = *Erigone pygmæa.*

Ceratinopsis Emerton = *Erigone.*

N. Engl. Therid. Trans. Conn. Ac., VI, p. 36.

C. interpres (Cambr.) Emerton = *Erigone interpres.*
C. laticeps Emerton = *Erigone laticeps.*
C. nigriceps Emerton = *Erigone nigriceps.*
C. nigripalpis Emerton = *Erigone nigripalpis.*

Grammonota Emerton = *Erigone.*

N. Engl. Therid. Trans. Conn. Ac., VI, p. 38.

G. inornata Emerton = *Erigone inornata.*
G. ornata (Cambr.) Emerton = *Erigone ornata.*
G. pictilis (Cambr.) Emerton = *Erigone pictilis.*

Spiropalpus Emerton = *Erigone.*

N. Engl. Therid. Trans. Conn. Ac., VI, p. 39.

S. spiralis Emerton = *Erigone spiralis.*

Cornicularia Menge = *Erigone.*

Preuss. Spinn., p. 226.

C. auranticeps Emerton = *Erigone auranticeps.*
C. brevicornis Emerton = *Erigone brevicornis.*
C. clavicornis Emerton = *Erigone clavicornis.*
C. communis Emerton = *Erigone communis.*
C. directa (Cambr.) Emerton = *Erigone directa.*
C. indirecta (Cambr.) Emerton = *Erigone indirecta.*
C. minuta Emerton = *Erigone paullula.*
C. tibialis Emerton = *Erigone tibialis.*
C. tricornis Emerton = *Erigone tricornis.*

Lophocarenum Menge = *Erigone.*

Preuss. Spinn., p. 198.

L. castaneum Emerton = *Erigone castanea.*
L. crenatum Emerton = *Erigone crenatum.*
L. decemoculatum Emerton = *Erigone decemoculata.*

L. depressum Emerton = *Erigone depressa.*
L. erigonoides Emerton = *Erigone erigonoides.*
L. florens (Cambr.) Emerton = *Erigone florens.*
L. latum Emerton = *Erigone lata.*
L. longitarsis Emerton = *Erigone longitarsis.*
L. longitibus Emerton = *Erigone longitibus.*
L. montanum Emerton = *Erigone montana.*
L. montiferum Emerton = *Erigone montifera.*
L. pallidum Emerton = *Erigone pallens.*
L. quadicristatum Emerton = *Erigone quadricristata.*
L. rostratum Emerton = *Erigone rostrata.*
L. scopuliferum Emerton = *Erigone scopulifera.*
L. simplex Emerton = *Erigone simplex.*
L. spiniferum (Cambr.) Emerton = *Erigone spinifera.*

Lophomma Menge = *Erigone.*

Preuss. Spinn., p. 209.

L. cristata (Blackw.) Emerton = *Erigone cristata.*
L. elongata Emerton = *Erigone elongata.*

Tmeticus Menge = *Erigone.*

Preuss. Spinn., p. 184.

T. bidentatus Emerton = *Erigone bidentata.*
T. bostonensis Emerton = *Erigone bostonensis.*
T. brunneus Emerton = *Erigone fusca.*
T. concavus Emerton = *Erigone concava.*
T. contortus Emerton = *Erigone contorta.*
T. longisetosus Emerton = *Erigone longisetosa.*
T. maximus Emerton = *Erigone maxima.*
T. microtarsis Emerton = *Erigone microtarsis.*
T. montanus Emerton = *Erigone collina.*
T. pallidus Emerton = *Erigone pallescens.*
T. pertinens (Cambr.) Emerton = *Erigone pertinens.*
T. plumosus Emerton = *Erigone plumosa.*
T. probatus Emerton = *Erigone probata.*
T. terrestris Emerton = *Erigone terrestris.*
T. tibialis Emerton = *Erigone monticola.*
T. tridentatus Emerton = *Erigone tridentata.*
T. truncatus Emerton = *Erigone truncata.*

Gonatium Menge = *Erigone.*

Preuss. Spinn., p. 180.

G. rubens Emerton = *Erigone rubens.*

Microneta Menge = *Erigone.*

Preuss. Spinn., p. 227.

M. cornupalpis Emerton = *Erigone cenupalpis.*
M. crassimanus Emerton = *Erigone crassimanus.*
M. discolor Emerton = *Erigone discolor.*
M. furcata Emerton = *Erigone furcata.*

M. latidens Emerton = *Erigone latidens.*
M. longibulbus Emerton = *Erigone longibulbus.*
M. olivacea Emerton = *Erigone olivacea.*
M. persoluta (Cambr.) Emerton = *Erigone persoluta.*
M. quinquedentata Emerton = *Erigone quinquedentata.*
M. vivaria (Blackw.) Emerton = *Erigone vivaria.*

Tribus VII ORBITELARIÆ.

Family EPEIRIDÆ.

1817. *Orbiteles* Latreille. Cuvier's Règne Anim. R., III, p. 86.
1823. *Retiariæ* Sund. Gen. Aran. Suec., p. 15.
1825. *Orbitelæ* Latr. Fam. Natur. du Règne Anim., p. 317.
1833. *Epeirides.* Sund. Conspect. Arachn., p. 13.
1850. *Epeirides* C. Koch. + *Mithraides* Uebers. d. Arachn. Syst., v, pp. 8, 15.
1869. *Epeiroidæ* Thorell. On Europ. Spid., p. 47.
1884. *Epeiridæ* Emerton. N. Eng. Epeirid. Trans. Conn. Ac., VI, p. 296.
1887. *Euetrioidæ* Thorell. Ragni Birmani. Ann. Mus., Civic., d Genoa, XXV.

GASTERACANTHA.

Latreille. Cours. d'Entomologie, p. 530. 1831.

1833. **Sund.** Conspect. Arachn., p. 26.
1837. *Plectana* Walck. Ins. Apt., II, p. 150 *ad part.*

***G. cancriformis** Linn. (*Aranea*). Syst. Natur. Ed., XI, p. 1037. Fla., Ala., Tex., Ariz., N. Mex., Cal.
Plectana elipsoides Walck. Abbot Ga. Spid. Ins. Apt., II, p. 155.
Plectana cancriformis Walck. Ins. Apt., II, p. 151.
Epeira cancer Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 23. *Id.*, Spid. U. S., ed. Burgess, p. 126, pl. 14, fig. 13.

G. elipsoides Walck. (Plectana)=*cancriformis.*

***G. pallida** C. Koch. Die Arachn., XI, p. 60, fig. 881. Cal.

G. preciosa Marx. Keyserling Die Spinn. Amerikas IV, Epeiridæ.
G. rufospinosa Marx = *velitaris.*

***G. velitaris** C. Koch. Die Arachn., IV, p. 33, fig. 269. Fla., Ala., Ga., La., Miss., S.C.
Plectana velitaris Walck. Ins. Apt., II, p. 152.
Casteracantha rufospinosa Marx. Entomologica Americana, II, p. 25.

ACROSOMA.

• *Perty.* Delect. anim. artic., III. 1834.

1833. *Micrathena* Sundev. Conspect. Arachn., p. 12.
1837. *Plectana* Walck. Ins. Apt., II, p. 150 *ad part.*
1863. *Acrosoma* Keyserling. Beschr. n. Orbitel. Sitz. d. Isis, 1863, p. 63.
1865. *Acrosoma Id.* Beitr. z. Kenntn. d. Orbr. Verh. d. z. b. Ges. Wien., p. 800.

A. gracile Walck. (Note 15) (*Plectana*). Abbot Ga. Spid. Ins. Apt., II, p. 193. Fla., Ga., La., Ala., Va., Md., Pa., D. C., Ind., Conn., N. Y.
A. matronale C. Koch. Die Arachniden, XI, p. 68, fig. 887.
Epeira rugosa Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 21. *Id.* Spid. U.S., ed. Burgess, p. 124, pl. 14, fig. 10.
Acrosoma rugosa Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 326, pl. 38, fig. 10.

A. matronale C. Koch = *gracile*.
A. mitrata Emerton = *reduvianum*.
A. reduvianum Walck. (*Plectana*). Abbot Ga. Spid. Ins. Apt., II, p. 201. Conn., N. Y., Pa., Md., D. C., Va., N. C.
  Epeira mitrata Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 22. *Id.* Spid. U.S., ed. Burgess, p. 125, pl. 14, fig. 11.
  Acrosoma mitrata Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 327, pl. 38, fig. 9.
A. rugosa Emerton = *gracile*.
A. sagittatum Walck. (*Plectana*). Abbot Ga. Spid. Ins. Apt., II, p. 174. N. Engl., Fla., Ga., Ala., Miss., La., Va., D. C., Md.
  Epeira spinea Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 21. *Id.* Spid. U. S., ed. Burgess, p. 123, pl. 14, fig. 9.
  Acrosoma spinea Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 326, pl. 38, figs. 5–8.
A. spinea Emerton = *sagittatum*.
Acrosoma aculeatum (Note 16) C. Koch. Die Arachn., III, p. 58, fig. 211, Amerika.
  Plectana aculeata Walck. Ins. Apt., II, p. 180.
  Plectana gladiola Walck. *Ibid.*, p. 182.
Acrosoma crassispinum C. Koch. Die Arachn., III. p. 55, fig. 209. Amerika.
  Plectana crassispina Walck. Ins. Apt., II, p. 180.

Plectana Walck.

Ins. Apt., II, p. 150. 1837.

P. aculeata Walck. = *Acrosoma aculeatum*.
P. cancriformis Walck. = *Gasteracantha cancriformis*.
P. crassispina Walck. = *Acrosoma crassispinum*.
P. elipsoides Walck. = *Gasteracantha cancriformis*.
P. gladiola Walck. = *Acrosoma aculeatum*.
P. gracilis Walck. = *Acrosoma gracile*.
P. reduviana Walck. = *Acrosoma reduvianum*.
P. sagittata Walck. = *Acrosoma sagittatum*.
P. stellata Walck. = *Epeira stellata*.
P. velitaris Walck. = *Gasteracantha velitaris*.

CERCIDIA.

Thorell. On Europ. Spid., p. 58. 1869.

1866. *Cerceis* Menge. Preuss. Spinn., p. 80.

C. funebris Keyserling. Die Spinn. Am., IV, Epeiridæ. Fla.

ARGIOPE.

Sav. and Aud. Descr. de l'Egypt Ed. 2, XXII, p. 328. 1825–'27.

1829. *Argyopes* Latr. In Cuvier's Regne Anim., V, p. 528.
1831. *Argiope* Latr. Cours d'Entom., p. 529.
1869. *Argiope* Thorell. On Europ. Spid., p. 51.
1874. *Argiope* Simon. Arachn. de France, p. 27.
1884. *Argiope* Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 328.

*__A. argentata__ Fabr. (*Aranea*). Entom. System, II, p. 414. Fla., Tex., Cal., Ariz.

Argiopes argentatus C. Koch. Die Arachn., V, p. 38, fig. 360.

Epeira argentata Walck. Ins. Apt., II, p. 115, pl. 18, fig. 3. Penn.

A. argyraspides Walck. (*Epeira*). Abbot Ga. Spid. Ins. Apt., II, p. 110. N. Y., Mass., Conn., Pa., Md., D. C., Va., N. C., Cal., Ariz., Kans.

Epeira fasciata Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 468. *Id.*, Spid. U. S., ed. Burgess, p. 107, pl. 12, fig. 8.

Epeira fasciata Cragin. Contribut. to Knowl. of Arachn., of Kans., Bull. Washburn Coll., 1, No. 4, p. 146.

Epeira transversa Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 330, pl. 24, fig. 20.

*__A. avara__ Thorell. Freg. Eugenies Resa. Araneæ, p. 27. Ariz., Cal.

A. basilica McCook. (*Epeira*). Proc. Acad. Nat. Sciences, Phila., 1878, p. 124. Tex., D. C.

A. cophinaria Walck. (*Epeira*). Abbot Ga. Spid. Ins. Apt., II, p. 109. Mass., Conn., N. Y., Pa., Md., D. C., Va., La., Fla., Cal., N. Mex.

Epeira riparia Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 468. *Id.*, Spid. U. S., ed. Burgess, p. 106, pl. 12, fig. 5.

Epeira riparia Cragin. Contribut. to Knowl. of Archn. of Kans., Bull. Washburn Coll., 1, No. 4, pl. 146.

Epeira ambitoria Walck. Ins. Apt., II, p. 112.

Nephila vestita C. Koch. Die Arachn., V, p. 35, fig. 358.

Argiope riparia Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 329, pl. 34, fig. 19.

A. multiconcha Treat. Americ. Natural., 1887, p. 1122 = var. of *cophinaria*. N. J.

A. riparia Emerton = *cophinaria*.

A. transversa Emerton = *argyraspides*.

GEA.

C. Koch. Die Arachn., X, p. 101. 1843.

1872. *Ebæa* L. Koch. Die Arachn. Australiens, p. 130.

G. heptagon Hentz (*Epeira*). Journ. Bost. Soc. Nat. Hist., VI, p. 20. *Id.*, Spid. U. S., ed. Burgess, p. 122, pl. 14. fig. 4. D. C., Va., Ala., Fla.

ORDGARIUS.

Keyserling in L. Koch's Die Arachn. Austral., II, p. 114. 1886.

O. bisaccatus Emerton (*Crytarachne*). N. Engl. Epeir. Trans. Conn. Ac., VI, p. 325, pl. 34, fig. 11. Conn., D. C., Va.

O. cornigerus Hentz (*Epeira*). Journ. Bost. Soc. Nat. Hist., VI, p. 20. *Id.*, Spid. U. S., ed. Burgess, p. 123, pl. 14, fig. 8. Ala., D. C., Va., La.

Cyrtarachne cornigera Keyserling. N. Spid. a. Am., I. Verhn. d. z. b. Ges. Wien, 1879, p. 300, pl. 4, fig. 4.

Cyrtarachne bicurvata Becker. Ann. Soc. Ent. Belgique, 1879, p. 77.

MAHADEVA.

Keyserling. Die Spinn. Am., IV, Epeiridæ.

M. verrucosa Hentz (*Epeira*). Journ. Bost. Soc. Nat. Hist., VI, p. 19. *Id.*, Spid. U. S., ed. Burgess, p. 121, pl. 14, fig. 2. D. C., Va., Fla., Ala.

CAREPALXIS.

L. Koch. Die Arachn. Australiens, p. 123.

C. tuberculifera Keyserling. Die Spinn. Am., IV, Epeiridæ. Fla.

EPEIRA.

Walck. Tab. d'Aran., p. 53. 1805.

1837. *Epeira* C. Koch. Uebers. d. Ar. Syst., I, p. 2.
1837. *Atea Id.* *Ibid.*, I, p. 3.
1837. *Miranda Id.* *Ibid.*, I, p. 4.
1847. *Epeira* Hentz. Journ. Bost. Soc. Nat. Hist., vol. V, p. 467. *Id.*, Spid. U. S., ed. Burgess, pp. 7, 105.
1869. *Epeira* Thorell. On Europ. Spid., p. 53.
1874. Simon. Arachn. de France, I, p. 46.
1884. *Epeira* Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 298.

E. aculeata Emerton. Append. to Thorell's Descr. of Arachn., coll. in Colorado. Bull. U. S. Geol. Surv. Terr., III, No. 2, 1877, p. 528, fig. 18. Colo.
E. affinis Blackw. = *cornuta.*
E. alba Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 20. *Id.*, Spid. U. S., ed. Burgess, p. 122, pl. 14, fig. 7. N. C., Fla.
E. alba Keyserling = *leucogaster* Marx.*
E. alboventris Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 314, pl. 34, fig. 5, pl. 36, fig. 12. Me., Mass.
E. ambitoria Walck. = *Argiope cophinaria.*
E. anaglypha Walck. Abbot Ga. Spid. Ins. Apt., II, p. 128. Ga., Cal.
E. ánastera Walck. *Ibid*, II, p. 33. Ga.
***E. angulata** Clerk (*Araneus*). Sv. Spid., p. 22, pl. 1, tab. 1, figs. 1–3. Mass., Ill., Oregon, Tex.
    Aranea angulata Linn. Syst. Nat. Ed., XI, p. 620.
    Epeira angulata Walck. Tab. d'Aran., p. 57 *ad part.*
    Epeira eremita C. Koch. Herr-Schaeff. Deutschl. Ins., 131, 23, 24.
    Epeira quercetorum Id. Uebers. d. Ar. Syst., I, p. 2.
    Epeira pinetorum Id. *Ibid.*, I, p. 3.
    Epeira angulata Id. Die Arachn., XI, p. 77, figs. 892, 893.
    Epeira angulata Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 299, pl. 33, fig. 12, pl. 35, fig. 2.
E. annulipes Giebel = *conspicellata.*
E. apoclisa americana Walck. = *cornuta.*
E. apoclisa Giebel = *cornuta.*
E. apotroga Walck. Abbot Ga. Spid. Ins. Apt., II, p. 43. Ga.
E. aproximata Blackw. Spid. fr. Canada. Ann. and Mag. of Nat. Hist., XVII, p. 80. Canada.
E. arabesca Walck. (Bosc.) Ins. Apt., II, p. 75. Ca., Ga., Ala., Fla., Tex., N. Mex., Utah, Cal., D. C., Va., Pa., N. Engl.
    trivittata Keyserling. Beschr. n. Orbit Sitz. d. Isis Dresden, 1864, p. 95, pl. 5, figs. 6–9.
    trivittata Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 311, pl. 33, fig. 16, pl. 36, figs, 2, 3, 5, 8.
E. arenata Walck. = *Mahadeva verrucosa.*
E. argentata Walck. = *Argiope argentata.*
E. aureola Hentz. = *trifolium* Hentz.

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*As *alba* Keyserling is preoccupied by Hentz I change it to *leucogaster*.

***E. audax** Blackw. Ann. and Mag. Nat. Hist. (3), XI, p. 29. Florida. (Dr. Neal.)

meridionalis Keyserling. Verh. d. z. b. Ges. Wien, 1865, p. 810, pl. 19, figs. 19, 20.

decem tuberculata Bertkau. Verz. d. bras. Arachn. ges. v. Van Beneden., p. 91, pl. 2, fig. 33.

E. balaustina McCook. Proc. Ac. Nat. Sc., Phila., 1888, p. 198. Florida.

E. baltimoriensis Keyserling = *Thaddeus.*

E. basilica McCook = *Argiope basilica.*

E. bella Marx in Keyserling. Die Spinn Am., IV, Epeiridæ. Florida.

E. benjamina Walck. Abbot Ga. Spid. Ins. Apt., II, p. 43. U. S.

domiciliorum Hentz. Journ. Bost. Sc. Nat. Hist., V, p. 469. *Id.*, Spid. of U. S., ed. Burgess, p. 108, pl. 12, fig. 7.

domiciliorum Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 312, pl. 33, fig. 17, pl. 36, figs. 1, 4.

hentzii Keyserling. Beschr. n. Orbitel. Sitz. d. Isis Dresden, 1864, p. 97, pl. 5, figs. 10, 11.

E. bicentennaria McCook. Proc. Ac. Nat. Sc., Phila., 1888, p. 194, figs. 1–5. Ohio, Pa.

E. bispinosa Keyserling. N. Spid. a. Am., VI. Verh. d. z. b. Ges. Wien, 1884, p. 531, fig. 30. Cal.

E. bivariolata Keyserling. Die Spinn. Am., IV, Epeiridæ. Colo., Oregon., Wyo.

E. bivittata Walck. Abbot Ga. Spid. Ins. Apt., II, p. 78. Ga.

E. bombycinaria Hentz = *eustala.*

E. borealis Marx in Keyserling. Die Spinn. Am., IV, Epeiridæ. Ounalaska.

E. calix Walck. Abbot Ga. Spid. Ins. Apt., II, p. 90. Ga.

E. californica Marx in Keyserling. Die Spinn. Am., IV, Epeiridæ. San Diego, Cal.

E. callida Walck. (Bosc. MSS.) Ins. Apt., II, p. 68. Canada.

E. canadensis Blackw. Spid. fr. Canada. Ann. and Mag. of Nat. Hist., XVII, p. 81. Canada.

E. cancer Hentz = *Gasteracantha cancriformis* Linn.

***E. carbonaria** L. Koch. Beitr. z. Kent. d. Ar. Tirols. Zeitschr. d. Ferdin, 1869, p. 168. N. H., Colo., Cal., D. C., Labr.

carbonaria Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 315, pl. 33, fig. 18, pl. 36, figs. 18, 19.

packardi Thorell. Spinn. fr. Labrador. Proc. Bost. Soc. Nat. Hist, XVII, p. 490.

E. carbonarioides Keyserling. Die Spinn. Am., IV., Epeiridæ. Cal., Colo., D. C.

E. caroli Hentz = *Cyclosa caroli.*

E. caudata Hentz = *Cyclosa turbinata.*

E. cauta Walck. Ins. Apt., II, p. 35. N. Y.

E. cavatica Keyserling. N. Spinn. a. Am., III. Verh. d. z. b. Ges. Wien, 1881, p. 269, pl. 11, fig. 1. Ky., N. H., Me., Tenn.

cinerea Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 302, pl. 33, fig. 10, pl. 35, figs. 7, 8.

E. cepina Walck. Abbot Ga. Spid. Ins. Apt., II, p. 37. Ga.

E. cerasiæ Walck. = *stellata.*

E. cinerea Emerton = *cavatica.*

E. cingulata Walck. Abbot Ga. Spid. Ins. Apt., II, p. 40. Ga.

E. circulata Walck. Abbot Ga. Spid. Ins. Apt., II, p. 79. Ga.

E. conchlea McCook. Proc. Ac. Nat. Sc., Phila., 1888, p. 199, fig. 6 = Variety of *Ep. eustala* Walck.

E. conspicellata Walck. = *marmorea.*

E. cornigera Hentz = *Ordgarius cornigerus.*

***E. cornuta** Clerk (*Araneus*). Sv. Spindl., p. 39, pl. 1, tab. 2. Minn., Ill., Wis, Mass., Conn., N. Y., Pa., Md., D. C., Va.

apoclisa americana Walck. Ins. Apt., II, p. 62.

Epeira strix Hentz. Journ. Bost. Soc. Nat. Hist., v, p. 473. *Id.*, Spid. U. S., ed. Burgess, p. 112, pl. 13, fig. 5.

affinis Blackw. Spid. fr. Canada. Ann. Mag. Nat. Hist., XVIII, p. 77.

dubia Keyserling. Beschr. n. Orbitel. Sitz. d. Isis Dresden, p. 123, pl. 4, figs. 12, 13.

apoclisa Giebel. Spinn. a. Illinois. Zeitschr. f. Ges. Naturwiss, XXXIII, p. 249.

foliata Walck. Ins. Apt., II, p. 62. N. Y.

foliata Koch. Die Arachn., XI, p. 119, figs. 920, 921. Pa.

foliata Keyserling. Beschr. n. Orbitel., Sitz d. Dresden, p. 92, pl. 7, figs. 10, 11.

strix Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 305, pl. 33, fig. 5, pl. 35, fig. 12.

E. corticaria Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 300, pl. 33, fig. 14, pl. 35, fig. 9. Mass., N. Y.

E. crucifera Keyserling. Beschr. n. Orbitel., Sitz d. Isis Dresden, p. 132, pl. 6, figs. 11, 12. N. A.

***E. cucurbitana** Clerk. (*Araneus*). Sv. Spindl., p. 44, pl. 2, tab. 4. Ga., Canada.

——— Walck. Abbot Ga. Spid. Ins. Apt., II, p. 77.

——— Blackw. Spid. fr. Montreal. Ann. and Mag. Nat. Hist., VIII, p. 429.

E. decipiens Fitch. Trans. N. Y. State Agric. Soc., XV., p. 451. *Id.*, 1 and 2. Report on Noxious Ins., p. 219. N. Y.

E. decolorata Walck. Abbot Ga. Spid. Ins. Apt., II, p. 49.

E. deludens Marx Keyserling. Die Spinn. Am., IV, Epeir. Fla.

E. diademata Clerk (*Araneus*). Sv. Spindl., p. 25, pl. 1, fig. 2. Minn. (Ainsley's coll.). N. Foundl.

——— Cambridge. Spid. fr. N. Foundl. Proc. Roy. Phys. Soc., 1881, p. 112.

E. directa Hentz. Journ. Bost. Soc. Nat. Hist., v, p. 478. *Id.*, Spid. U. S., ed. Burgess, p. 119, pl. 13, fig. 21. S. C., Ala.

E. displicata Hentz. *Ibid.*, p. 476. *Id.*, *ibid.*, p. 117, pl. 13, fig. 17. Ala., Fla., Tex., Colo., Va., D. C., Md., N. Engl., Ohio, Cal.

——— Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 313, pl. 34, fig. 4, pl. 36, fig. 20.

E. dissimulata Walck. Abbot Ga. Spid. Ins. Apt., II, p. 60. Ga.

E. domiciliorum Hentz = *benjamina*.

E. dubia Keyserling = *cornuta*.

***E. ectypa** Walck. Abbot Ga. Spid. Ins. Apt., II, p. 129. Ga., N .C., Ala., Fla., Va., D. C., Conn.

——— Keyserling. Beschr. n. Orbitel. Sitz. d. Isis Dresden, p. 135, pl. 6, figs. 13–16.

infumata Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 19. *Id.*, Spid. U. S., ed. Burgess, p. 122, pl. 14, fig. 4.

infumata Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 319, pl. 37, figs. 11, 12, 13.

E. emphana Walck. Abbot Ga. Spid. Ins. Apt., II, p. 74. Ga.

E. ergaster Walck. *Ibid.*, II, p. 55. Ga.

E. eustala Walck. *Ibid.*, II, p. 37. U. S.

bombycinaria Hentz. Journ. Bost. Soc. Nat. Hist., v, p. 476. *Id.*, Spid. U. S., ed. Burgess, p. 117, pl. 13, fig. 16.

parvula Keyserling. Beschr. n. Orbitel. Sitz. d. Isis. Dresden, 1864, p. 131.

parvula Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 317, pl. 34, fig. 12, pl. 37, figs. 1, 2.

parvula McCook. Proc. Ac. Nat. Soc., Phila., 1888, p. 199.

E. eustalina Marx in Keyserling's. Die Spinn. Am., IV, Epeirdæ. Key West, Fla.

E. famulatoria Keyserling. N. Spinn. a. Am., IV. Verh., d. z. b. Ges. Wien, 1882, p. 201, pl. 15, fig 6. Colo.

E. fasciata Hentz = *Argiope argyraspides* Walck.

E. foliata Walck = *cornuta*.

E. foliata Hentz = *folifera* Marx.

E. folifera Marx. (Note 17.)

  foliata Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 475. *Id.*, Spid. U. S. ed. Burgess, p. 116, pl. 13, fig. 14.

  foliata Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 318, pl. 37, figs. 6–10.

E. foliosa Walck. Abbot. Ga. Spid. Ins. Apt., II, p. 66. Ga.

E. forata Keyserling. Die. Spinn. Am., IV, Epeiridæ.

E. formosa Keyserling = *palagiata* Clerk.

E. frondosa Walck. Abbot Ga. Spid., Ins. Apt., II, p. 65. Ga.

E. fulva Walck. *Ibid.*, II, p. 129. Ga.

E. gemma McCook. Proc. Ac. Nat. Sc., Phila., 1888, p. 193. Cal., Dak.

E. gibberosa Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 457. *Id.*, Spid. U. S., ed. Burgess, p. 119, pl. 13, fig. 20. Ala., Fla., Va., D. C., Mass., R.I., Conn.

——— Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 317, pl. 34, fig. 1, pl. 36, fig. 17.

*__E. globosa__ (Note 18) Keyserling. Beitr. z. K. d. Orbit. Berh. d. z. b. Ges. Wien, XV, p. 820, pl. 18, figs. 19–21.

  triaranea McCook. Proc. Nat. Sc., Phila., 1876, p. 201.

  globoso McCook. Proc. Ac. Nat. Sc., Phila., 1878, p. 127.

  triaranea Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 315, pl. 34, fig. 9, pl. 36, figs. 6, 7.

E. glomosa Walck = *Cyclosa turbinata*.

E. graduata Walck. Abbot. Ga. Spid. Ins. Apt., II, p. 48. Ga., N. Y.

E. guttulata Walck. Abbot. Ga. Spid. Ins. Apt., II, p. 78. Ga.

E. hamata Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 474. *Id.*, Spid. U. S., ed. Burgess, p. 114, pl. 13, fig. 10. Ala.

E. hebes Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 473. *Id.*, Spid. U. S., ed. Burgess, p. 113, p. 13, fig. 7. S. Atlantic States.

E. heidemannii Marx Keyserling. Die Spinn. Am., IV, Epeiridæ. Bladensburg, D.C.

E. hentzii Keyserling = *benjamina*.

E. heptagon Hentz = *Gea heptagon*.

E. hilaris Cambr. = *patagiata*.

E. hortorum Hentz = *Argyoepeira hortorum*.

E. illustrata Walck. Abbot Ga. Spid. Ins. Apt., II, p. 45. Ga.

E. incestifica Keyserling. Die Spinn. Am., IV, Epeiridæ.

E. infumata Hentz = *ectypa*.

E. insularis Hentz = *marmorea*.

E. iris Walck. = *stellata*.

E. jaspidata Walck. Abbot Ga. Spid. Ins. Apt., II, p. 59. Ga.

E. juglandi Marx Keyserling. Die Spinn. Am., IV, Epeiridæ. Minn., Lake Itasca.

E. juniperi Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 313, pl. 34, fig. 6, pl. 36, figs. 14, 15, 16. Me., Mass.

E. labyrinthea Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 471. *Id.*, Spid. U. S., ed. Burgess, p. 111, pl. 13, fig. 3. N. C., Ala., D. C., Va., N. Y., Cal., Pa., Conn., Mass.

——— Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 314, pl. 34, fig. 8, pl. 36, fig. 11.

E. leucogaster Marx. Ky.

alba Keyserling. N. Spinn. a. Am., VI. Verh. d. z. b. Ges. Wien, 1884, p. 531, pl. 6, fig. 29.

E. limbata Walck. Abbot Ga. Spid. Ins. Apt., II, p. 81. Ga.

E. maculata (Note 19) Keyserling. Beitr. z. K. d. Orbital, Verh. d. z. b. Ges. Wien, 1865, p. 827, pl. 18, figs. 24, 27. Md., D. C., Ga., Va.

E. maesta Keyserling. Die Spinn. Am., IV, Epeiridæ. N. Mex.

***E. marmorea** Clerk (*Araneus*). Sv. Spindl., p. 29, pl. 1, tab. 3. U. S.

Aranea marmorea Fabr. Syst. Entom., p. 434.

Epeira marmorea Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 307, pl. 33, fig. 2.

conspicellata Walck. Abbot Ga. Spid. Ins. Apt., II, p. 58.

insularis Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 470. *Id.*, Spid. U. S., ed. Burgess, p. 109, pl. 12, fig. 10.

insularis Hentz Keyserling. Beschr. n. Orbitel. Sitz. d. Isis Dresden, p. 91, pl. 5, figs. 3, 5.

insularis Hentz, Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 309, pl. 33, fig. 1, pl. 35, fig. 18.

obesa (Note 20) Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 471. *Id.*, Spid. U. S., ed. Burgess, p. 110, pl. 12, fig. 11.

obesa Hentz Cambridge. Spid. fr. New Foundland. Proc. Roy. Phys. Soc., Edinb., p. 112. 1881.

annulipes Giebel. Spinn. v. Illinois. Zeitschr f. ges. Naturwiss, XXXIII, p. 250.

E. maura Hentz = *Singa maura.*

E. mayo Marx, Keyserling. Die Spinn. Am., IV, Epeiridæ. Minn.

E. miniata Walck. Abbot Ga. Spid. Ins. Apt., II, p. 39. Ga.

E. mitrata Hentz = *Acrosoma reduvianum.*

E. mormon Keyserling. Die Spinn. Am., IV, Epeiridæ.

E. mutabilis Walck. Abbot Ga. Spid. Ins. Apt., II, p. 73. Ga.

E. nephiloides Keyserling. Die Spinn. Am., IV, Epeiridæ. Santa Barbara, Cal.

E. nephoda Walck. Abbot Ga. Spid. Ins. Apt., II, p. 74. Ga.

E. nicaraguensis Keyserling. N. Spinn. a. Am., VI. Verh. d. z. b. Ges. Wien, 1884, p. 532, fig. 31. Cal.

E. nivea Hentz. Journ Bost. Soc. Nat. Hist., V, p. 474. *Id.*, Spid. U. S., ed. Burgess, p. 114, pl. 13, fig. 9. Ala.

E. nobilis Walck. = *stellata.*

E. nordmanii Thorell. Synom. on Eur. Spid., p. 4. N. H., Me., Mass., Pa., N.Y.

——— Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 301, pl. 33, fig. 6.

E. obesa Hentz = *marmorea.*

E. packardi Thorell = *carbonaria.*

E. patagiata Clerk (*Araneus*). Sv. Spindl., p. 38, pl. 1, tab. 10. N. Engl., Alaska, Mont., Lake Superior, Labrador, Ill., N. Y., Pa., Md. D. C., Va.

——— Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 305, pl. 33 fig. 3, pl. 35, fig. 11.

dumectorum Hahn. Die Arachn., II, p. 31, fig. 117.

formosa Keyserling. Beitrg. z. k. d. Orbitel. Verh. d. z. b. Ges. Wien., 1865, p. 828, pl. 19, figs. 17, 18.

hilaris Cambridge. Spid. fr. New Foundland. Proc. Roy. Phys. Soc. Edinbg., 1881, p. 112.

E. partita Walck. Abbott Ga. Spid. Ins. Apt., II, p. 46. Ga.

E. parvula Keyserling = *eustala.*

E. pegnia Walck. Abbot Ga. Spid. Ins. Apt., II, p. 80. Ga.

E. pentagona Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 18. *Id.*, Spid. U. S., ed. Burgess, p. 120, pl. 14, fig. 1. Ala.

E. petasata Walck. Abbot Ga. Spid. Ins. Apt., II, p. 70, Ga.

E. phrygiata Walck. Abbot Ga. Spid. Ins. Apt., II, p. 54. Ga.

E. placida Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 475. *Id.*, Spid. U. S., ed. Burgess, p. 115, pl. 13, fig. 12. Mass., Conn., Pa., D. C., Va., Fla.

——— Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 316, pl. 34, fig. 2, pl. 36, figs. 10, 13.

E. plumipes Walck. = *Nephila plumipes.*

E. prætrepida Keyserling. N. Spinn. a. Am., II. Verh. d. z. b. Ges. Wien, 1880, p. 549, pl. 16, fig. 2. Ga.

E. pratensis Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 475. *Id.*, Spid. U. S., ed. Burgess, p. 115, pl. 13, fig. 11. Mass., Utah, D. C., Mo.

——— Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 310, pl. 33, fig. 15, pl. 36, fig. 9.

E. prompta Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 472. *Id.*, Spid. U. S., ed. Burgess, p. 112, pl. 13, fig. 4.

***E. punctigera** Doleschall. Tweede Bijdrage tot de Kennis. d Arachn. Indian Archipel.

E. punctillata Keyserling = *scutulata.*

E. radiosa McCook = *Theridiosoma radiosa.*

***E. ravilla** C. Koch. Die Arachn., XI, p. 73, fig. 890. Tex., Ariz.

E. reptilis Keyserling. Die Spinn. Am., IV, Epeiridæ.

E. riparia Hentz = *Argiope cophinaria.*

E. rubella Hentz = *Singa rubella.*

E. rubens Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 477. *Id.*, Spid. U. S., ed. Burgess, p. 118, pl. 13, fig. 18. Ala.

E. rugosa Hentz = *Acrosoma gracile.*

E. sacra Walck. Abbot Ga. Spid. Ins. Apt., II, p. 33. Ga.

E. sanguinalis Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 476. *Id.*, Spid. U. S., ed. Burgess, p. 116, pl. 13, fig. 15. Ala.

E. schwarzii Marx. Keyserling Die Spinn. Am., IV, Epeiridæ. Biscayne Bay, Fla.

E. sclopetaria Clerck. (*Araneus*). Sv. Spindl., p. 43, pl. 2, tab. 3, fig. 1. U. S.

——— Blackw. Spid. fr. Montreal. Ann. and Mag. of Nat. Hist., 1871, VIII, p. 429.

——— Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 303, pl. 33, fig. 4, pl. 35, fig. 10.

virgata Hahn. Die Arachn., II, p. 26, fig. 113.

sericata Blackw. Spid. of Gr. Brit., II, p. 328, pl. 23, fig. 238.

sericea Simon. Hist. Nat. d'Araign., p. 492.

vulgaris Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 469. *Id.*, Spid. U. S., ed. Burgess, p. 108, pl. 12, fig. 6.

E. scutulata Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 19. *Id.*, Spid. U. S., ed. Burgess, p. 121, pl. 14, fig. 3.

punctillata Keyserling. N. Spinn. a. Am., I. Verh. d. z. b. Ges. Wien, 1879, p. 304, pl. 4, fig. 7. Ill.

E. segmentata Walck. Abbot Ga. Spid. Ins. Apt., II, p. 120. Ga.

E. septima (Note 20) Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 470. *Id.*, Spid. U. S., ed. Burgess, p. 104, pl, 12, fig. 9. Ala., N. C. = var. of *cavatica.*

——— Cragin. Contrib. to Knowl. of Arachn. of Kansas. Bull. Washb. College, I, No. 4, p. 146.

E. sexpunctata Keyserling. N. Spinn. a. Am., VI. Verh. d. z. b. Ges. Wien, 1884, p. 530, pl. 13, fig. 28. N. Am.

E. silvatica Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 300, pl. 34, fig. 13, pl. 35, figs. 1, 4, 5, 6. Mass., N. Y., N. H.

E. solitaria Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 299, pl. 33, fig. 11, pl. 35, fig. 3. Mass.

E. spatulata Walck. Abbot Ga. Spid. Ins. Apt., II, p. 44. Ga.

E. spiculata Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 475. *Id.*, Spid. U. S., ed. Burgess, p. 116, pl, 13, fig. 13. Ala.

E. spinea Hentz = *Acrosoma sagittatum.*

E. spinigera Keyserling. Die Spinn. Am., IV, Epeiridæ. Ariz.

E. spira Bosc. Walck. Ins. Apt., II, p. 80. Ga.

E. stellata Walck. (*Plectana*). Tabl. d'Aran., p. 65, fig. 54.

——— (*Plectana*). Bosc. Ins. Apt., II, p. 171.

——— Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 22. *Id.*, Spid. U. S., ed. Burgess, p. 125, pl. 14, fig. 12.

——— Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 319, pl. 34, fig. 17, pl. 37. figs. 3, 4, 5.

——— Keyserling. Beschr. N. Orbitel. Sitz. d. Isis Dresden, 1864, p. 140, pl. 6, figs, 24, 25.

nobilis Walck. Abbot Ga. Spid. Ins. Apt., II, p. 119.

cerasiæ Walck. Abbot Ga. Spid. Ins. Apt., II, p. 119.

iris Walck. Abbot Ga. Spid. Ins. Apt., II, p. 120.

E. strix Hentz = *cornuta.*

E. subfusca Walck. Abbot Ga. Spid. Ins. Apt., II, p. 76. Ga.

E. sutrix Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 478. *Id.*, Sp. U. S., ed. Burgess, p. 120, pl. 13, fig. 23. S. C., Pa.

E. tauricornis Keyserling. Die Spinn. Am., IV, Epeiridæ.

E. thaddeus Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 473. *Id.*, Spid. U. S., ed. Burgess, p. 113, pl. 13, fig. 6. Ala., Md., Conn., Mass., D. C., Va., S. C., Tenn., Fla.

——— Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 309, pl. 34, fig. 9.

baltimoriensis Keyserling. N. Spinn. a. Am., I. Verh. d. z. b. Ges. Wien, 1879, p. 305, pl. 4, fig. 8.

E. theis Walck. Ins. Apt., II, p. 53, pl. 18, fig. 4. Oregon.

E. tranquilla Keyserling. Die Spinn. Am., IV, Epeiridæ. Washington, D. C.

E. triaranea McCook = *globosa.*

E. triflex Walck. Abbot Ga. Spid. Ins. Apt., II, p. 60. Ga.

E. trifolium Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 471. *Id.*, Spid. U. S., ed. Burgess, p. 110, pl. 13, fig. 1. Dak., N. Mex., Ala., N. Engl., Canada, N. Y., Pa., Md., D. C., Va., Wyo., Mont., Colo.

——— Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 306, pl. 33, fig. 8, pl. 35, figs. 13, 14, 21, 22.

aureola Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 471. *Id.*, Spid. U. S., ed. Burgess, p. 111, pl. 13, fig. 2.

E. trinotata Walck. Abbott Ga. Spid. Ins. Apt., II, p. 75. Ga.

E. trivitata Keyserling = *arabesca.*

E. turbinata Walck. = *Cyclosa turbinata.*

E. tytera Walck. Abbot Ga. Spid. Ins. Apt., II, p. 80. Ga.

E. venusta Walck. Abbot Ga. Spid. Ins. Apt., II, p. 96. Ga.

E. verrucosa Hentz = *Mahadeva verrucosa.*

E. vertebrata McCook. Proc. Ac. Nat. Sc., Phila., 1888, p. 196, figs. 6–10. Cal.

E. vivida Walck. Abbot Ga. Spinn. Ins. Apt., II, p. 54. Ga.

E. volucripes Keyserling. N. Spinn. a. Am., VI. Verh. d. z. b. Ges. Wien, 1884, p. 528, pl. 13, fig. 27. Ala., La., Tex., Ga., Tenn.

E. vulgaris Hentz. = *sclopetaria.*

E. vulpeculata Walck. Abbot Ga. Spid. Ins. Apt., II, p. 69. Ga.

CYCLOSA.

Menge. Preuss. Spinn., p. 73. 1866.

1869. *Cyrtophora* Thorell. On Europ. Spid., p. 57 (*ad part*).
1874. *Cyclosa* Simon. Arachn. de France. I., p. 36.

C. bifurca (Note 21) McCook (*Cyrtophora*). Proc. Acad. Nat. Sc., Phila., 1887, p. 342. Fla.

C. caroli Hentz (*Epeira*). Journ. Bost. Soc. Nat. Hist., VI, p. 24. *Id.*, Spid. U. S., ed. Burgess, p. 128, pl. 14, fig. 15. Ala., D. C.

Epeira caroli Keyserling. Beschr. n. Orbitel. Sitz. des. Isis Dresden, p. 137, pl. 6, fig. 17.

C. conica (Note 22) Pallas (*Aranea*). Spicilog. Zoolog., I., p. 48, pl. 1, fig. 16. San Diego, Cal.

C. conica Emerton = *turbinata*.

C. turbinata Walck (*Epeira*). Abbot Ga. Spid. Ins. Apt., II, p. 140. Mass., Me., N. Y., Ohio, Conn., Pa., Md., D. C., Va., Ala., Fla., La.

Epeira caudata Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 23. *Id.*, Spid. U. S., ed. Burgess, p. 126, pl. 14, fig. 14.

Epeira glomosa Walck. Abbot Spid. Ga. Ins. Apt., II, p. 143.

Cyclosa conica Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 321, pl. 34, fig. 3, pl. 38, fig. 11.

CYRTOPHORA.

E. Simon. Hist. Nat. d' Araign, p. 262. 1864.

1874. *Id.*, Arachn. de France I, p. 33.

C. bifurca McCook = *Cyclosa bifurca*.

C. californiensis Keyserling. N. Spinn. a. Am. VI. Verh. d. z. b. Ges. Wien., 1884, p. 525, pl. 13, fig. 24. Cal.

C. tuberculata Keyserling. Die Spinn. Am., IV, Epeiridæ.

SINGA.

C. Koch. Die Arachn., III, p. 42. 1836.

1837. C. Koch. Ubers. d. Ar. Syst., p. 6.
1871. Ausserer. N. Rad. Spinn. Verh. d. z. b. Ges. Wien, p. 815.
1884. Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 321.

S. maculata Emerton. N. Engl. Epeira. Trans. Conn. Ac., VI, p. 323, pl. 37, fig. 18. Conn., D. C., Fla.

S. maura Hentz (*Epeira*). Journ. Bost. Soc. Nat. Hist., V, p. 474. *Id.*, Spid. U. S., ed. Burgess, p. 114, pl. 13, fig. 8. Ala., D. C.

S. mollybyrneae Marx. Keyserling Die Spinn. Am., IV, Epeiridæ. Biscayne Bay, Fla.

S. nigripes Keyserling. N. Spinn. a. Am., V. Verh. d. z. b. Ges. Wien, 1883, p. 655, pl. 21, fig. 7. Fla., Tex.

S. pratensis Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 322, pl. 34, fig. 15, Mass., Me., Conn.

S. rubella Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 478. *Id.*, Spid. U. S., ed. Burgess, p. 120, pl. 13, fig. 22. Ala., D. C.

S. van Bruysellii Becker. Ann. Soc. Ent. Belgique, XXII, 1879, p. 78, pl. 1, figs 4, 5, 6. Miss.

S. variabilis Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 322, pl. 34, fig. 16. Mass., Me., Conn., D. C.

LARINIA.

Simon. les Arachn. de France, I, p. 115. 1874.

L. nigrofoliata Keyserling. N. Spinn. a. Am., V. Verh. d. z. b. Ges. Wien, 1883, p. 653, pl. 21, fig. 5. Utah.

ZILLA.

C. Koch. Herr-Schaeff. Deutschl. Ins., 125, 19. 1834.

1871. Ausserer. N. Rad Spinnen. Verh. d. z. b. Ges. Wien, p. 828.
1884. Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 323.

***Z. atrica** C. Koch (*Eucharia*). Die Arachn., XII, p. 103, figs. 1030, 1031 (for synonyms of European authors see Thorell. On Synonyms, p. 31). Cal., Mass.

***Z. montana** C. Koch. Herr-Schaeff. Deutschl. Ins., 125, 19. *Id.*, Die Arachn., VI, p. 146, figs. 536, 537. N. Y., N. H.

——— Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 323, pl. 34, fig. 14, pl. 37, figs. 22, 23, 26, 28.

***Z. x-notata** Clerck (*Araneus*). Sv. Spindl., p. 46, pl. 2, tab. 5.

——— Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 324, pl. 34, fig. 13, pl. 37, figs. 24, 25, 27, pl. 40, fig. 2.

Epeira calophylla Walck. Tabl. d'Aran., p. 62.
Zilla calophylla C. Koch. Die Arachn., VI, p. 148, figs. 538, 539.
Epeira similis Blackw. Spid. of Gr. Brit., II, p. 337, pl. 25, fig. 244.

ARGYROEPEIRA.

Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 331. 1884.

1837. *Tetragnatha* Walck. 2. Coadunatæ. Ins. Apt., II, p. 219.
1863. *Tetragnatha* Keyserling. Beschr. n. Orbitel. Sitz. d. Isis. Dresden, p. 14 *ad part.*
1865. *Meta* Keyserling. Beitr. z. Kenntn. d. Orbitel. Verh. d. z. b. Ges. Wien, p. 830 *ad part.*

***A. argyra.** Walck. (*Tetragnatha*). Ins. Apt., II, p. 219. Fla.

A. hortorum Hentz (*Epeira*). Journ. Bost. Soc. Nat. Hist., V, p. 477. *Id.*, Spid. U. S., ed. Burgess, p. 118, pl. 13, fig. 19. U. S.

——— Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 332, pl. 37, fig. 29. 32.

***A. quinque lineata** Keyserling. Beschr. n. Orbitel. Sitz. d. Isis. Dresden, 1863, p. 145, pl. 7, figs. 3–6. Baltimore.

META.

C. Koch. Herr-Schaeff. Deutschl. Ins. 134, 12, 13; 135, 14, 16. 1836. *Id.*, Ueber d. Arachn. Syst., I, p. 6. 1836.

1869. Thorell. On Europ. Spid., p. 61.
1874. Simon. Arachn. de France, I, p. 145.
1884. Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 328.

***M. menardi** Latr. (*Aranea*). Hist. Nat. d. Crust. et de Ins., VII, p. 266. Mass., Ky., Va., D. C.

Meta fusca C. Koch. Die Arachn., VIII, p. 118, figs. 685–7.
Epeira fusca Blackw. Spid. of Gr. Brit., II, p. 349, fig. 252.
Meta menardi Thorell. Rem. on Synon., p. 38.
Meta menardi Simon. Arachn. de France, I, p. 151.
Meta menardi Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 328, pl. 34, fig. 18.

NEPHILA.

Leach. Zool. Miscellany, Vol. II. 1815.

***N. clavipes** Fabr. (*Aranea*). Ent. Syst., II, p. 420. Texas.
——— C. Koch. Die Arachn., V, p. 31, fig. 355.
***N. fasciculata** De Geer. Mem. p. serv. a l'hist., d. Ins., VII, p. 124, pl. 39, fig 1. Fla., Tex.
——— C. Koch. Die Arachn., V, p. 30, fig. 354.
N. maculata Fabr. (*Aranea*). Syst. Entom., II, p. 425. Cal.
N. plumipes C. Koch. Die Arachn., VI, p. 138, fig. 529. La., Miss., Ga., Ala., S.C.
Epeira plumipes Walck. Ins. Apt., II, p. 99.

THERIDIOSOMA (Note 23.).

Cambridge. Ann. and Mag. Nat. Hist., p. 193. 1879.

1884. Keyserling. Die. Spinn. Am., Theridiidæ, I, p. 217.

T. argentatum Keyserling. Die. Spinn. Am., Theridiidæ, I, p. 218, fig. 132. Ga.
***T. gemmosum** L. Koch. Verzeichn. d. bei Nurnberg beob. Arten., p. 69. Pa., Ill. Mass., Conn.
——— Keyserling. Die. Spinn. Am., Theridiidæ, I, p. 218, fig. 131.
Theridiosoma argenteolum Cambridge. Ann. Mag. at. Hist., 194. 1879.
Micræpeira radiosa Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 302, pl. 24, fig 7. Pa., Ohio.
T. radiosum McCook. Proc. Phila. Ac. Nat. Sc., 1881, p. 163.

CYRTARACHNE Thorell.

C. bicurvata Becker = *Ordgarius cornigerus*.
C. bisaccata Emerton = *Ordgarius bisaccatus*.
C. cornigera Keyserling = *Ordgarius cornigerus*.

Family TETRAGNATHIDÆ (Note 24).

1866. *Menge*. Preuss. Spinn. *Tetragnathidæ* + *Pachygnathidæ*.
1874. *Tetragnathinæ* Simon. Arachn. de France, I., p. 153.
1881. *Tetragnathinæ Id. Ibid.*, V, p. 2.
1884. *Tetragnathinæ* Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 298.
1887. *Tetragnathidæ* Keyserling. Die Arachn. Austral., II, p. 217.

TETRAGNATHA.

Latreille. Nouv. Dict. d'Hist. Nat., XXIV, p. 135. 1804.

1843. *Dinognatha* White-Dieffenb. Trav. in N. Zeal., II, p. 271.
1866. *Tetragnatha* Menge. Preuss. Spinn., p. 90.
1874. *Tetragnatha* Simon. Arachn. de France, I, p. 153.

1881. *Tetragnatha Id.* *Ibid.* v, p. 2.
1887. *Tetragnatha* Keyserling. Die Arachn. Austral., ii, p. 217.

T. armigera Blackw. Spid. from Canada. Ann. and Mag. Nat. Hist., xvii, p. 81. Canada.
T. aurata Walck. Abbot Ga. Spid. Ins. Apt., ii, p. 215. Ga.
T. casula Walck. Abbot Ga. Spid. Inst. Apt., p. 219. Ga.
T. caudata Emerton = *Eucta caudata.*
T. culicivora Walck. Abbot Ga. Spid. Ins. Apt., ii, p. 214. Ga.
T. elongata Walck. Tabl. d'Aran., p. 69. U. S.
——— Thorell. Aran. coll. in Col. Bull. U. S. Geol. Surv., Terr., iii, No. 2, p. 477.
grallator Hentz. Journ. Bost. Soc. Nat. Hist., vi, p. 26. *Id.*, Spid. U. S., ed. Burgess, p. 131, pl. 15, figs. 1, 2.
grallator Keyserling. Beitr. z. K. d. Orbit. Verh. d. z. b. Ges. Wien, xv, p. 850, pl. 21, figs 24–27.
grallator Emerton. N. Engl. Epeir. Trans. Conn. Ac., vi, p. 334, pl. 39, figs. 1–6.
***T. extensa** Linn (*Aranea*). Syst. Nat. Ed., xi, p. 621. N. Y., Mass.
——— Thorell. Spid. fr. Labrador. Proc. Bost. Soc. Nat. Hist., xvii, p. 493.
——— Emerton. N. Engl. Epeir. Trans. Conn. Ac., vi, p. 333, pl. 39, figs. 9, 10.
T. fimbriata Walck. Abbot Ga. Spid. Inst. Apt., ii, p. 213. Ga.
T. fluviatilis Keyserling. Beitr. z. K. d., Orbitel. Verh. d. z. b. Ges. Wien, 1864, p. 852, pl. 21, fig. 10. Mackenzie River, D. C.
T. fragilis Marx in Keyserling's. Die Spinn. Am., iv, Epeiridæ. Fla.
T. fulva Walck. Abbot Ga. Spid. Ins. Apt., ii, p. 212. Ga.
T. grallator Hentz = *elongata.*
T. illinoisensis Keyserling. N. Spinn. a. Am., i. Verh. d. z. b. Ges. Wien, 1879, p. 318, pl. 4, fig. 18. Ill.
T. laboriosa Hentz. Journ. Bost. Soc. Nat. Hist., vi, p. 27. *Id.*, Spid. U. S., ed. Burgess, p. 131, pl. 15, fig. 3. Mass., Conn., D. C., Md., Va., Ohio, Utah, Nebr., Alaska.
——— Keyserling. Beitr. z. K. d. Orbitel. Verh. d. z. b. Ges. Wien, p. 841, pl. 20, figs. 16, 17.
——— Emerton. N. Engl. Epeir. Trans. Conn. Ac., vi, p. 334, pl. 39, figs. 7, 8, 11, 19, pl. 40, fig. 7.
T. lazerta Walck. Abbot Ga. Spid. Ins. Apt., ii, p. 224. Ga.
T. lutea Walck. Abbot Ga. Spid. Ins. Apt., ii, p. 217. Ga.
T. sanctitata Walck. Abbot Ga. Spid. Ins. Apt., ii, p. 214. Ga.
T. straminea Emerton = *Eugnatha straminea.*
T. trapezoides Walck. Abbot Ga. Spid. Ins. Apt., ii, p. 218. Ga.
T. vermiformis Emerton = *Eucta vermiformis.*
T. versicolor Walck. Abbot Ga. Spid. Ins. Apt., ii, p. 215. Ga.
T. violacea Walck. Abbot Ga. Spid. Ins. Apt., ii, p. 218. Ga.
T. viridis Walck. Abbot Ga. Spid. Ind. Apt., ii, p. 216. Ga.
T. zorilla Walck. = *Lathrodectus mactans.*

EUCTA.

Simon. Les Arachn. de France, v. 1, p. 5. 1881.

Keyserling. Die Arachn. Austral., ii, p. 218.

E. caudata Emerton (*Tetragnatha*). N. Engl. Epeir. Traus. Conn. Ac., vi, p. 335, pl. 39, figs. 16–22. Mass., Fla., Ala., Ariz., D. C., Tex.
E. vermiformis Emerton (*Tetragnatha*). N. Engl. Epeir. Trans. Conn. Ac., vi, p. 333, pl. 39, figs. 12, 13, 14. Mass., Utah.

EUGNATHA.

Sav. and *Aud.* Descr. de l'Egypt, XXII. 1825-'27.

1881. Simon. Arachn. de France, V, I, p. 2.
1887. Keyserling. Die Arachn. Austral., II, p. 218.

E. straminea Emerton (*Tetragnatha*). N. Engl. Epeir. Trans. Conn. Ac., VI, p. 335, pl. 39, figs. 15, 17, 20, 21. D. C., Va., Fla.

PACHYGNATHA.

Sundev. Gen. Arach. Suecic., p. 16. 1823.

1866. Menge. Preuss. Spinn., p. 94.
1869. Thorell. On Europ. Spid., p. 77.
1881. Simon. Les Arachn. de France, V, I, p. 7.

P. autumnalis Keyserling. N. Spinn. a. Am., V. Verh. d. z. b. Ges. Wien, 1883, p. 660, pl. 21, fig. 10. Pa., Mass., Conn.

——— Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 337, pl. 34, fig. 22, pl. 40, fig. 9.

P. brevis Keyserling. N. Spinn. a. Am., IV. Verh. d. z. b. Ges. Wien, p. 209 (described under the name *tristriata* C. Koch). Conn., Mass., Canada.

——— *Id.* N. Spinn. a. Am., V. Verh. d. z. b. Ges. Wien, 1883, p. 658.

——— Emerton. N. Engl. Epeir. Trans. Conn. Ac., VI, p. 336, pl. 34, fig. 21, pl. 40, figs. 8, 10.

P. furcillata Keyserling. N. Spinn. a. Am., V. Verh. d. z. b. Ges. Wien, 1883, p. 662, pl. 21, fig. 11. Pa., D. C.

***P. tristriata** C. Koch. Die Arachn., XII, p. 145, fig. 1066. D. C., Pa., N. Y.

——— Keyserling. N. Spinn. a. Am., V. Verh. d. z. b. Ges. Wien, 1883, p. 656, pl. 21, fig. 8.

***P. xanthostoma** C. Koch. Die Arachn., XII, p. 148, fig. 1068. Pa., D. C.

——— Keyserling. N. Spinn. a. Am., V. Verh. d. z. b. Ges. Wien, 1883, p. 659, pl. 21, fig. 9.

Family ULOBORIDÆ.

1850. ***Mithraides*** **ad part.** C. Koch. Uebers. d. Arachn. Syst., V, p. 15.
1869. *Uloborinæ* Thorell. On Europ. Spid., p. 64.
1872. *Uloboridæ* Cambridge. Spid. of Palest. and Syria. Proc. Lond. Zool. Soc., p. 302.
1874. *Uloboridæ* E. Simon. Arachn. d. France, I, p. 164.
1888. *Uloborinæ* Emerton. N. Engl. Cinifl. Trans. Conn. Ac., VII, p. 454.

HYPTIOTES.

Walck. Mem. s. une nouv. classif. d'Aran., p. 438. 1833.

1837. *Mithras* C. Koch. Uebers. d. Arachn. Syst., I, p. 6.
1847. *Cyllopoda* Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 465.

H. cavatus Hentz (*Cyllopoda*). Journ. Bost. Soc. Nat. Hist., V, p. 466. *Id.*, Spid. U. S., ed. Burgess, p. 104, pl. 12, fig. 3, pl. 20, fig. 21. Ala., Mass., R. I., N. Y., Me., D. C., Va., Md.

——— Emerton. N. Engl. Cinifl. Trans. Conn. Ac., VII, p. 456, pl. 2, fig 2.

americanus Wilder. Triangle Spid. Pop. Sci. Monthl., 1875, Sepr., p. 2.

Cyllopoda Hentz = *Hyptiotes*.

ULOBORUS.

Latreille. Gen. Crust. et Ins., I, p. 109. 1806.

1855. *Phillyra* Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 25.
1859. *Neleda* Blackw. Descr. of 6 rec. discov. Spec., p. 95.

U. americanus Walck. Abbot Ga. Spid. Ins. Apt., II, p. 229. Eastern States.
Phillyra mameata Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 25. *Id.*, Spid. U. S., ed. Burgess, p. 129, pl. 14, fig. 16, pl. 19, fig. 126.
Uloborus villosus Keyserling. N. Spinn. a. Am., III. Verh. d. z. b. Ges. Wien, 1881, p. 278, pl. 11, fig. 6.
***U. plumipes** Lucas. Explor. d'Algerie Anim., art. I, p. 252, pl. 15, fig. 8.
——— Emerton. N. Engl. Cinifl. Trans. Conn. Ac., VII, p. 454, pl. 11, fig. 11.
Phillyra riparia Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 26. *Id.*, Spid. U. S., ed. Burgess, p. 130, pl. 14, fig. 17.
***U. zosis** Walck. Ins. Apt., II, p. 231. Fla.
——— L. Koch. Die Arachn. Austral., p. 221.

Phillyra Hentz = *Uloborus.*

Tribus VIII LATERIGRADÆ.

Family THOMISIDÆ.

1817. *Laterigrades* Latreille. Cuv. Règne Anim., III, p. 91.
1823. *Retrogradæ* Sund. Gen. Aran. Suec., p. 18.
1825. *Laterigradæ* Latreille. Fam. Nat. du Règne Anim., p. 315.
1833. *Thomisides* Sund. Conspect. Arachn., p. 27.
1869. *Thomisoidæ* Thorell. On Europ. Spid., p. 170.
1887. *Misumenoidæ* Thorell. Ragni Birm. Ann. Mus., CIV, Genoa, XXV.

I. Subfamily THOMISINÆ.

XYSTICUS.

C. Koch. Herr.-Schæff. Deutschl. Ins., 129, 16, 17. 1835.

1869. Thorell. On Europ. Spid., p. 185.
1875. Simon. Arachn. d. France, III, p. 150.

X. auctificus Keyserling. Die Spinn. Am., I, Laterigradæ, p. 25, fig. 10. Colo.
X. benefactor Keyserling Die Spinn. Am., I, Laterigradæ, p. 22, fig. 8. Colo.
X. bicuspis Keyserling. N. Spinn. a. Am., VII, Verh. d. z. b. Ges. Wien, 1887, p. 478, (58) pl. 6, fig. 38. Mont.
X. borealis Keyserling. N. Spinn. a. Am., V, Verh. d. z. b. Ges. Wien, 1883, p. 668, (22) pl. 21, fig. 17. Sitka, Ft. Yukon, Alaska.
X. californicus Keyserling. Die Spinn. Am., I, Laterigradæ, p. 37, fig. 17. Mariposa, Cal.
X. cunctator Thorell. Aran. coll. in Colo. Bull. U. S. Geol. Surv., Terr., III, No. 2, 1877, p. 495. Colo.
X. discursans Keyserling. Die Spinn. Am., I, Laterigradæ, p. 20, fig. 7. Colo., Nev.
X. elegans Keyserling. Die Spinn. Am., I, Laterigradæ, p. 31, fig. 14. Ga.
X. emertonii Keyserling. Die Spinn. Am., I, Laterigradæ, p. 39, fig. 18. Ga., N. H., Mont.

X. feroculus Keyserling. N. Spinn. a. Am., III, Verh. d. z. b. Ges. Wien, 1881, p. 305 (39) pl. 11, fig. 24. Mass., D. C.

X. flavovittatus Keyserling. Die Spinn. Am., I, Laterigradæ, p. 33, fig. 15, U. S.

X. funestus Keyserling. Die. Spinn. Am., I, Laterigradæ, p. 10, fig. 2. Md., Va., D. C., N. C., N. H., Colo.

X. gulosus Keyserling. Die Spinn. Am., I, Laterigradæ, p. 43, fig. 21. U. S.

X. hamatus Keyserling. N. Spinn. a. Am., VI, Verh. d. z. b. Ges. Wien, 1885, p. 521 (35), pl. 13, fig. 22. Ky.

X. labradoriensis Keyserling. N. Spinn. a. Am., VII, Verh. d. z. b. Ges. Wien, 1887, p. 479 (59) pl. 6, fig. 39. Ungava Bay, Labrador.

X. lenis Keyserling. Die Spinn. Am., I, Laterigradæ, p. 27, fig. 11. Colo.

X. limbatus Keyserling. Die Spinn. Am., I, Laterigradæ, p. 35, fig. 16. Colo, Tex., Ill., D. C., Va., Md.

X. locuples Keyserling. Die Spinn. Am., I, Laterigradæ, p. 24, fig. 9. Cal., Nev., Wyo.

X. maculatus Keyserling. Die. Spinn. Am., I, Laterigradæ, p. 45, fig. 22. Ga.

X. montanensis Keyserling. N. Spinn. a. Am., VII, Verh. d. z. b. Ges. Wien, 1887, p. 479 (59), pl. 6, fig. 40. Mont., Cal.

X. nigromaculatus Keyserling. N. Spinn. a. Am., V. Verh. d. z. b. Ges. Wien. 1884, p. 670 (24), pl. 21, fig. 18. Colorado.

X. punctatus Keyserling. Die Spinn. Am,, I, Laterigradæ, p. 30, fig. 13. N. C.

X. quadrilineatus Keyserling. Die Spinn. Am., I, Laterigradæ, p. 42, fig. 20, Ill., D. C., N. J.

X. quinquepunctatus Keyserling. Die Spinn. Am., I, Laterigradæ, p. 28, fig. 12. Cal., N. Mex., Fla., Va., D. C.

X. stomachosus Keyserling. Die Spinn. Am., I, Laterigradæ, p. 7, fig, 1. Ind., Ill., Colo., D. C., N. H., Labrador.

X. triguttatus Keyserling. Die Spinn. Am., I, Laterigradæ, p. 12, figs. 3, 6. Mass., Colo., Ga., Lake Sup., Labrador, D. C., Va.

X. variabilis Keyserling. Die Spinn. Am., I, Laterigradæ, p. 40, fig. 19. Ga.

X. vernilis Keyserling. N. Spinn. a. Am., III. Verh. d. z. b. Ges. Wien, 1881, p. 304 (38), pl. 11, fig. 23. Utah.

OXYPTILA.

Simon. Hist. Nat. d. Aran. 1864.

1875. *Simon.* Arachn. d. France, II, p. 211

O. conspurgata Thorell. Aran. coll. in. Colorado. Bull. U. S. Geol. Surv. Terr., III, No. 2, 1877, p. 496. Colorado.

O. georgiana Keyserling. Die Spinn. Am., I, Laterigradæ, p. 52, fig. 26. Ga.

O. monroensis Keyserling. N. Spinn. a. Am., V. Verh. d. z. b. Ges. Wien, 1883, p. 671 (25), pl. 21, fig. 19. Va., D. C.

O. nevadensis Keyserling. Die Spinn. Am., I. Laterigradæ, p. 50, fig. 25. Nev.

CORIARACHNE.

Thorell. On Europ. Spid., p. 186. 1869.

C. versicolor Keyserling. Die Spinn. Am., I, Laterigradæ, p. 53, fig. 27. U. S.

SYNEMA.

Simon. Hist. Nat. d'Aran. 1864.

S. bicolor Keyserling. N. Spinn, a. Am., V. Verh. d. z. b. Ges. Wien, 1883, p. 667 (21), pl. 21, fig. 16. Fla., D. C., Va.

S. nigromaculata Keyserling. Die Spinn. Am., I, Laterigradæ, p. 61, fig. 31. Md., D. C., Va., Ga.

S. obscura Keyserling. Die Spinn. Am., I, Laterigradæ, p. 64, fig. 32. N. H.

S. parvula Hentz (*Thomisus*). Journ. Bost. Soc. Nat. Hist., V, p. 447. *Id.*, Spid. U. S., ed. Burgess, p. 80, pl. 10, fig. 8. Southern States, Cal.

——— Keyserling. Die Spinn. Am., I, Laterigradæ, p. 57, fig. 28.

MISUMENA.

Latreille. Nouv. Dict. d'Hist. Nat., XXIV, p. 135 (*ad part*). 1804.

1869. Thorell. On Europ. Spid., p. 183.
1875. Simon. Arachn. d. France, II, p. 241.

M. alabamensis Keyserling. N. Spinn. a. Am., V. Verh. d. z. b. Ges. Wien, 1883, p. 666 (20), pl. 21, fig. 15. Ala.

M. americana Keyserling. Die Spinn. Am., I, Laterigradæ, p. 85, fig. 44. Md., Ga., Ill., D. C., Va.

M. conspersa Keyserling. Die Spinn. Am., I, Laterigradæ, p. 107, fig. 60. Cal., Ariz., Fla.

M. diegoi Keyserling. N. Spinn. a. Am., VII. Verh. d. z. b. Ges. Wien, 1887, p. 481 (61), pl. 6, fig. 41. Cal.

M. dubia Keyserling. Die Spinn. Am., I, Laterigradæ, p. 90, fig. 48. Fla., Tex., D. C.

M. georgiana Keyserling. Die Spinn. Am., I, Laterigradæ, p. 86, fig. 45. Ga., D. C.

M. importuna Keyserling. N. Spinn. a. Am., III. Verh. d. z. b. Ges. Wien, 1881, p. 307 (41), pl. 11, fig. 25. Cal.

M. mexicana Keyserling. Die Spinn. Am., I, Laterigradæ, p. 89, fig. 47. Cal.

M. oblonga Keyserling. Die Spinn. Am., I, Laterigradæ, p, 79, fig. 41. Md., Ill., Va., D. C.

M. rosea Keyserling. Die Spinn. Am., I, Laterigradæ, p. 82, fig. 43. Southern States, Ill., Mo., D. C., Va., Md.

M. spinosa Keyserling. Die Spinn. Am., I, Laterigradæ, p. 81, fig. 42. Ga., Fla., Ala., La., Utah.

M. variegata Keyserling. Die Spinn. Am., I, Laterigradæ, p. 101, fig. 55. Fla.

***M. vatia** Clerk. (*Araneus*). Sv. Spindl., p. 128, pl. 6, tab. 5. U. S.

——— Thorell. Aran. coll. in Colorado. Bull. U. S. Geol. Surv., Terr., III, No. 2, 1877, p. 500.

——— Keyserling. Die Spinn. Am., I, Laterigradæ, p. 101.

Thomisus fartus Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 445. *Id.*, Spid. U. S., ed. Burgess, p. 78, pl. 10, fig. 4.

DIÆA.

Thorell. On Europ. Spid., p. 184. 1869.

1875. Simon. Arachn. de France, II, p. 247.

D. lepida Thorell. Aran. coll. in Colorado. Bull. U. S. Geol. Surv. Terr., III, No. 2, 1877, p. 498. Col.

RUNCINIA.

Simon. Arachn. de France, II, p. 254. 1875.

R. brendelii Keyserling. Die Spinn. Am., I., Laterigradæ, p. 127, fig. 70. U. S.

THOMISUS (Note 25).

Walck. Tabl. d'Aran., p. 28. 1805.

1875. Simon. Arachn. de France, II, p. 249.

T. aleatorius Hentz. Journ. Bost. Soc. Nat. Hist., v, p. 444. *Id.*, Spid. U. S., ed. Burgess, p. 77, pl. 10, fig. 2. Ala.
T. angulatus Walck. Abbot Ga. Spid. Ins. Apt., I, p. 537. Ga.
T. asperatus Hentz. Journ. Bost. Soc. Nat. Hist., v, p. 447. *Id.*, Spid. U. S., ed. Burgess, p. 79, pl. 10, fig. 7. Ala.
T. bicolor Walck. Abbot Ga. Spid. Ins. Apt., I, p. 533. Ga.
T. bigibbosus Keyserling. N. Spinn. a. Am., III. Verh. d. z. b. Ges. Wien, 1881, p. 309 (43), pl. 11, fig. 27. N. H.
T. caudatus Hentz = *Tmarus caudatus.*
T. celer Hentz. Journ. Bost. Soc. Nat. Hist., v, p. 446. *Id.*, Spid. U. S., ed. Burgess, p. 78, pl. 10, fig. 5, S. C. N. C. Mass., Ala., Ohio.
T. citreus Walck. Abbot Ga. Spid. Ins. Apt., I, p. 526. Ga.
——— Blackw. Spid. fr. Canada. Ann. and Mag. of Nat. Hist., XVII, p. 28.
T. conspergatus Walck. Abbot Ga. Spid. Ins. Apt., I, p. 524. Ga.
T. cruentatus Walk. *Ibid.*, p. 534. Ga.
T. delphinus Walck. *Ibid.*, p. 519. Ga.
T. desidiosus Walck. *Ibid.*, p. 501. Ga.
T. dubius Hentz = *Tetragonophthalma dubia.*
T. duttonii Hentz = *Tibellus duttonii.*
T. exaratus Walck. (Bosc. MSS.) Ins. Apt., I, p. 508. Carolina.
T. fartus Hentz = *Misumena vatia.*
T. ferox Hentz. Journ. Bost. Soc. Nat. Hist., v, p. 445. *Id.*, Spid. U. S., ed. Burgess, p. 77, pl. 10, fig. 3. U. S.
T. flavescens Walck. Abbot Ga. Spid. Ins. Apt., I, p. 519. Ga.
T. formosipes Walck. *Ibid.*, p. 504. Ga.
T. indiligens Walck. *Ibid.*, p. 506. Ga.
T. iners Walck. *Ibid.*, p. 530. Ga.
T. infumatus Walck. *Ibid.*, p. 508. Ga.
T. lemniscatus Walck. *Ibid.*, p. 525. Ga.
T. lentus Walck. *Ibid.*, p. 508. Ga.
T. luctans C. Koch. Die Arachn., XII, p. 63, fig. 998. Pa.
T. oscitans Walck. Abbot Ga. Spid. Ins. Apt., I, p. 510. Ga.
T. pardus Walck. Abbot Ga. Spid. Ins. Apt., I, p. 529. Ga.
T. parvulus Hentz = *Synema parvula.*
T. pictus Walck. Abbot Ga. Spid. Ins. Apt., I, p. 530. Ga.
T. piger Hentz. Journ. Bost. Soc. Nat. Hist., v, p. 446. *Id.*, Spid. U. S., ed. Burgess, p. 79, pl. 10, fig. 6. N. C.
T. phrygiatus Walck. Abbot Ga. Spid. Ins. Apt., I, p. 533. Ga.
T. purpuratus Walck. *Ibid.*, p. 506. Ga.
T. sphericus Walck. *Ibid.*, p. 501. Ga.
T. stigmatisatus Walck. *Ibid.*, p. 534. Ga.
T. tenuis Hentz = *Tetragonophthalma tenuis.*
T. transversatus Walck. Abbot Ga. Spid. Ins. Apt., I, p. 525. Ga.
T, tumefactus Walck. *Ibid.*, p. 502. Ga.
T. turgidus Walck. *Ibid.*, p. 502. Ga.
T. varians Walck. *Ibid.*, p. 504. Ga.
T. vulgaris Hentz = *Philodromus vulgaris,*

TMARUS.

Simon. Arachn. de France, II, p. 259. 1875.

T. caudatus Hentz (*Thomisus*). Journ. Bost. Soc. Nat. Hist., v, p. 447. *Id.*, Spid. U. S., ed Burgess, p. 80, pl. 10, fig. 9. Ala.
——— Keyserling. Die Spinn. Am., I, Laterigradæ, p. 157, fig. 84.
T. floridensis Keyserling. N. Spinn. a. Am., v. Verh. d. z. b. Ges. Wien, 1883, p. 673 (27), pl. 21, fig. 21. Fla., Ala., La., Tex.
T. griseus Keyserling. *Ibid.*, p. 672 (26), pl. 21, fig. 20. Fla.
T. magniceps Keyserling. Die Spinn. Am., I, Laterigradæ, p. 158, fig. 85. Cal.
T. rubromaculatus Keyserling. *Ibid.*, p. 158, fig. 86. Ga.

II. Subfamily PHILODROMINÆ.

EBO.

Keyserling. N. Spinn. a. Am., v. Verh. d. z. b. Ges. Wien, p. 678 (32). 1883.

E. latithorax Keyserling. N. Spinn. a. Am., v. Verh. d. z. b. Ges. Wien, 1883, p. 678, (32), pl. 21, fig. 26. Va., D. C., Md., Utah.

TIBELLUS.

Simon. Arachn. de France, II, p. 307. 1875.

1878. *Metastenus* Bertkau. Vers. e. nat. Anordn. d. Sp., p. 377.

T. duttonii Hentz (*Thomisus*). Journ. Bost. Soc. Nat. Hist., v, p. 448. *Id.*, Spid, U. S., ed. Burgess, p. 81, pl. 10, fig. 10. Southern States.
——— Keyserling. Die Spinn. Am., I, Laterigradæ, p. 194, fig. 107.
T. oblongus Walck. (*Philodromus*). Abbot Ga. Spid. Ins. Apt., I, p. 558. Middle States.
——— Simon. Arachn. d. Fr., II, p. 311, pl. 8, fig. 12.
——— Keyserling. Die Spinn. Am., I, Laterigradæ, p. 196.
Thomisus oblongus Hahn. Die Arachn., I, p. 110, fig 82.
Thanatus parallelus Koch. *Ibid.*, IV, p. 87, fig. 307.
Philodromus oblongus Blackw. Spid. of Gr. Brit., I, p. 100, fig. 60.

THANATUS.

C. Koch. Uebers. d. Arachn. Syst., I, p. 28. 1837.

1875. Simon. Arachn. de France, II, p. 314.

T. coloradensis Kerserling. Die Spinn. Am., I, Laterigradæ, p. 206, fig. 113 Colo.
T. rubicundus Keyserling. *Ibid.*, p. 204, fig. 112. Ga., D. C., Lake Superior, Tex. Wyo., Labrador, Alaska.

PHILODROMUS.

Walck. Faune de France Arachn., p. 86. 1825.

P. abottii Walck. Abbot Ga. Spid. Ins. Apt., I, p. 552. Ga.
P. alaskensis Keyserling. N. Spinn. a. Am., v. Verh. d. z. b. Ges. Wien, 1883, p. 674 (28), pl. 21, fig. 22. Aleutian Islands, Alaska, Nev., Oregon, Labrador, Utah.

***P. aureolus** Clerck. (*Araneus*). Sv. Spindl., p. 133, pl. 6, tab. 6. D. C., Pa., Md., Va., Utah, Colo., Lake Superior.

——— Thorell. Aran. coll. in Colorado. Bull. U. S. Geol. Surv.,Terr., III, No. 2, 1877, p. 500.

——— Keyserling. Die Spinn. Am., I, Laterigradæ. p. 217.

P. californicus Keyserling. N. Spinn. a. Am., V. Verh. d. z. b. Ges. Wien, 1883, p. 676 (30), pl. 21, fig. 24. Cal.

P. clarus Keyserling. Die Spinn. Am., I, Laterigradæ, p. 214. Nev., Va., D. C., Colo.

P. expositus Keyserling. *Ibid.*, p. 220, fig. 121. N. H.

P. imbecilus Keyserling. *Ibid.*, p. 224, fig. 123. Ga.

P. infuscatus Keyserling. *Ibid.*, p. 222, fig. 122. Md., D. C., Va.

P. inquisitor Walck. Abbot Ga. Spid. Ins. Apt., I, p. 553. Ga.

P. inquisitor Thorell.= *Thorellii* Marx (Note 26).

P. keyserlingii Marx (Note 27).

obscurus Keyserling. N. Spinn. a. Am., V. Verh. d. z. o. Ges. Wien, 1883, p. 675 (29), fig. 23. D C

P. laticeps Keyserling. Die Spinn. Am., I, Laterigradæ, p. 215, fig. 118. Ga.

P. lentiginosus Keyserling. N. Spinn. a. Am., III. Verh. d. z. b. Ges. Wien, 1881, p. 312 (46), fig. 29. Lake Superior.

P. maculatus Blackw. Spinn. fr. Canada. Ann. and Mag. Nat. Hist., XVII, p. 39.

P. marxii Keyserling. N. Spinn. a. Am., V. Verh. d. z. b. Ges. Wien, 1883, p. 677 (31), fig. 25. Texas.

P. oblongus Blackw. = *Tibellus oblongus.*

P. obscurus Blackw. Spid. fr. Montreal. Ann. and Mag. Nat. Hist., VIII, 1871, p. 429. Canada.

P. obscurus Keyserling = *Keyserlingii* Marx.

P. pernix Blackw. Spid. from Canada. Ann. and Mag. Nat. Hist., XVII, 1846, p. 36. Canada.

P. præceps Walck. Abbot Ga. Spid. Ins. Apt., I, p. 560. Ga.

P. prælustris Keyserling. Die Spinn. Am., I, Laterigradæ, p. 209, fig. 114. Colo.

P. rufus Walck. Faun. franc. Arachn., p. 91. *Id.*, Ins. Apt., I, p. 555. Md., D. C., Va.

——— Keyserling. Die Spinn. Am., I, Laterigradæ, p. 217, fig. 119. Mass., Ill.

P. satullus Keyserling. *Ibid.*, p. 211, fig. 116. Colo.

P. spectabilis Keyserling. *Ibid.*, p. 210, fig. 115. Colo.

P. thorellii Marx. Colo. (Note 29.)

inquisitor Thorell. Aran. coll. in Colo. Bull. U. S. Geol. Surv., Terr., III, No. 2, p. 502.

P. virescens Thorell. *Ibid.*, p. 500. Colo.

P. vulgaris Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 444. *Id.*, Spid. U. S., ed. Burgess, p. 76, pl. 10, fig. 1. U. S.

——— Keyserling. Die Spinn. Am., I, Laterigradæ, p. 218, fig. 120.

Family SPARASSIDÆ.

1874. Simon. Especes. Europ. fam. Sparas. Ann. Soc. Ent. Fr., p. 243.
1875. Simon. Arachn. de France, II, p. 331.

SELENOPS.

Latreille. Nouv. Dict. d'Hist. Nat., XXX. 1819.

1820. Dufour. Descr. de six Arachn. nouv. Ann. de Sc. Phys., V, p. 361.
1864. Simon. Hist. Nat. d'Araign., p. 420.

1869. Thorell. On Europ. Spid., p. 179.
1875. Simon. Arachn. de France, II, p. 344.

***S. aissa** Walck. Ins. Apt., I, p. 547. Fla.
——— Keyserling. N. Spinn. a. Am., v. Verh. d. z. b. Ges. Wien, 1883, p. 683, pl. 21, fig. 30.

OLIOS.

Walck. Ins. Apt., I, p. 563. 1837 *ad part.*

1864. Simon. Hist. Nat. d'Araign, p. 409 *ad part.*

O. abnormis Keyserling. N. Spinn. a. Am., v. Verh. d. z. b. Ges. Wien, 1883, p. 679, pl. 21, fig. 27. N. Mex.
O. concolor Keyserling. *Ibid.*, p. 682, pl. 21, fig. 29. N. Mex.
O. giganteus Keyserling. *Ibid.*, p. 681, pl. 21, fig. 28. N. Mex.

HETEROPODA.

Latreille. Nouv. Dict. d'Hist. Nat., XXIV, p. 135. 1804.

1830. *Sarotes* Sundev. Consp. Arachn., p. 28.
1837. *Ocypete* C. Koch. Uebers d. Arachn. Syst., I, p. 27.

***H. venatoria** Linn (*Aranea*). Syst. Nat. Ed., x, 1, II, p. 1037. Fla., Cal.
Aranea regia Fabr. Syst. Ent., p. 408.
Olios leucosius Walck. Ins. Apt., I, p. 566.
Olios antillanus Id. *Ibid.*, p. 568.
Ocypete murina Koch. Die Arachn., XII, p. 26, fig. 978.
Ocypete draco C. Koch. *Ibid.*, p. 44, fig. 983.
Olios zonatus Dolesch. Tweed. bijdr., etc., p. 54, pl. 14, fig. 4.
Olios regius Gerstacker. V. d. Deckens R. in Ost. Africa, III, p. 482.
Heteropoda regia Simon. Ann. Soc. Ent. France, 1877, p. 63.
Sarotes regius L. Koch. Die Arachn. Austral., p. 675, pl. 56, figs. 1, 2.
Sarotes venatorius McCook. Proc. Ac. Nat. Sc., Phila., 1878. p. 144.

MICROMATA Hentz.

Micromata carolinensis Hentz.
Micromata marmorata Hentz.
Micromata pinicola Hentz.
Micromata serrata Hentz.
Micromata subinflata Hentz.
Micromata undata Hentz.

These species are not of the genus *Micromata* at all, but belong, as Emerton first stated, to the genus *Ocyale.*

Tribus IX CITIGRADÆ.

Family LYCOSIDÆ.

1817. *Citigrades* Latreille. Cuvier's Régne Anim., III.
1823. *Cursores* Sundev. Gen. Aran. Suec.
1825. *Citigradæ* Latr. Fam. Nat. du Régne Anim.

1833. *Lycosides* Sundev. Conspect. Arachn., p. 23.
1869. *Lycosoidæ* Thorell. On Europ. Spid., p. 188.
1876. *Lycosidæ* Keyserling. Am. Citigradæ. Verh. d. z. b. Ges. Wien, p. 609.
1885. *Lycosidæ* Emerton. Trans. Conn. Ac., VI, p. 481.

LYCOSA.

Latreille. Nouv. Diction. d'Hist. Natur., XXIV, p. 135. 180..

1832. Hentz. Am. Journ. Science and Arts, XXI, p. 106.
1842. Hentz. Journ. Bost. Soc. Nat. Hist., IV, p. 228.
1875. Hentz. Spid. of the U. S., ed. Burgess, p. 24.
1876. Keyserling. Am. Citigradæ. Verh. d. z. b. Ges. Wien, p. 610.
1885. Emerton. N. Engl. Lycos. Trans. Conn. Ac., VI, p. 482.

L. animosa Walck. Abbot Ga. Spid. Ins. Apt., I, p. 331. Ga.

L. arenicola Scudder. Tube constr. Spid. of Nantucket. Psyche, II, p. 2, 1877. Conn., N. J., Md., D. C., Va.

——— McCook. Proc. Ac. Nat. Sc., Phila., 1888, p. 333.

Tarantula nidifex Marx. Am. Naturalist, 1881, p. 396.

Lycosa nidifex (Marx) Emerton. N. Engl. Lycos. Trans. Conn. Ac., VI, p. 487, pl. 47, fig. 4.

L. aspersa Hentz. Journ. Bost. Soc. Nat. Hist., IV, p. 389. *Id.*, Spid. U. S., ed. Burgess, p. 30, pl. 3, figs. 11, 12. Ala.

L. avida Walck. Abbot Ga. Spid. Ins. Apt., I, p. 323. Ga.

L. babingtonii Blackw. Spid. fr. Canada. Ann. and Mag. Nat. Hist., XVII, p. 30. Canada.

L. canadensis Blackw. Spid. fr. Montreal. *Ibid.*, VIII, 1871, p. 429.

L. carolinensis Walck. (Bosc. MSS.) Ins. Apt., I, p. 285.

——— Hentz. Journ. Bost. Soc. Nat. Hist., IV, p. 230. *Id.*, Sp. U. S., ed. Burgess, p. 27, pl. 2, fig. 9. N. Engl., Pa., Md., D. C., Va., N. C., S. C., La., Ga., Ala., Fla.

——— Emerton. N. Engl. Lycos. Trans. Conn. Ac., VI, p. 486, pl. 47, fig. 1.

L. cinerea (Fabr.) Emerton = *Trochosa cinerea.*

L. communis Emerton. N. Engl. Lycos. Trans. Conn. Ac., VI, p. 489, pl. 47, fig. 6. N. Engl.

L. concinna Thorell. Aran. coll. in Colo. Bull. U. S. Geol. Surv., Terr., III, No. 2, p. 506. Colo.

L. grassipes Walck. Abbot Ga. Spid. Ins. Apt., I, p. 323. Ga.

L. discolor Walck. *Ibid.*, p. 332. Ga.

L. distincta Blackw. Spid. fr. Canada. Ann. and Mag. Nat. Hist., XVII, p. 32. Canada.

L. encarpata Walck. Ins. Apt., I, p. 290. Phila.

L. erratica Hentz. Journ. Bost. Soc. Nat. Hist., IV, p. 388. *Id.*, Spid. U. S., ed. Burgess, p. 29, pl. 3, fig. 8. Mass., Ala., Ohio.

L. fatifera Hentz. *Ibid.*, p. 229. *Id.*, *ibid.*, p. 26, pl. 2, fig. 8. Mass., Ala., Kan.

——— Cragin. Contr. to Knowl. of Arachn. of Kansas. Bull. Washburn Coll., I, No. 4, p. 146.

L. flavipes Keyserling. Am. Citigradæ. Verh. d. z. b. Ges. Wien, 1876, p. 616, pl. 7, fig. 4. Md., Ill.

L. frondicola Emerton. N. Engl. Lycos. Trans. Conn. Ac., VI, p. 484, pl. 46, fig. 3. Conn.

L. funerea Hentz. Journ. Bost. Soc. Nat. Hist., IV, p. 393. *Id.*, Spid. U. S., ed. Burgess, p. 34, pl. 4, fig. 11. Ala.

L. furcifera Thorell. Spid. fr. Labrador. Proc. Bost. Soc. Nat. Hist., XVII, p. 499. Labrador.

L. fuscula Thorell. *Ibid.*, p. 501. Labrador.

L. georgiana Walck. (*Tarentula*). Abbot Ga. Spid. Ins. Apt. I, p. 286. Ga.

L. georgicola Walck. (*Tarentuloides*). *Ibid.*, p. 288. Ga.

L. grœnlandica Thorell. Spid. fr Labrador. Proc. Bost. Soc. Nat. Hist., XVII, p. 498. Labrador.

L. gulosa Walck. Ins. Apt., I, p. 338. N. Y.

L. helluo Walck. *Ibid.*, p. 337. N. Y.

L. impavida Walck. Abbot Ga. Spid. *Ibid.*, p. 324. Ga.

L. impavida (Note 28) Thorell. = ***intrepida*** Marx.

L. indagatrix Thorell. Aran. coll. in Colo. Bull. U. S. Geol. Surv. Terr., III, No. 2, p. 512. Colo.

L. infesta Walck. Abbot Ga. Spid. Ins. Apt., I, 332. Ga.

L. intrepida Marx (Note 28).

L. iracunda Thorell. Aran. coll. in Colo. Bull. U. S. Geol. Surv. Terr., III, No. No. 2, p. 514. Colo.

L. kochii Emerton = *Tarentula kochii.*

L. labradoriensis Thorell. Spid. fr. Labrador. Proc. Bost. Soc. Nat. Hist., XVII, p. 502. Labrador.

L. lenta Hentz. Journ. Bost. Soc. Nat. Hist., IV, p. 386. *Id.*, Spid. U. S., ed. Burgess, p. 27, pl. 3, figs. 1–4. Pa., N. C., S. C.

L. littoralis Hentz. *Ibid.*, p. 388. *Id.*, *ibid.*, p. 30, pl. 3, fig. 9. N. C., Ohio, D. C., Va., Md., N. J.

L. mackenziana Keyserling. Am. Citigradæ. Verh. d. z. b. Ges. Wien, 1876, p. 621, pl. 7, fig. 7. Mackenzie River.

L. maritima Hentz. Journ. Bost. Soc. Nat. Hist., IV, p. 389. *Id.*, Spid. U. S., ed. Burgess, p. 30, pl. 3, fig. 10. S. C., Mass., D. C., Va.

L. milbertii Walck. Ins. Apt., I, p. 336. N. Y.

L. milvina Hentz. Journ. Bost. Soc. Nat. Hist., IV, p. 392. *Id.*, Spid. U. S., ed. Burgess, p. 33, pl. 4, fig. 5. Ala.

L. minima Keyserling. Am. Citigradæ. Verh. d. z. b. Ges. Wien, 1876, p. 614, pl. 7, fig. 3. Ill.

L. modica Blackw. Spid. fr. Canada. Ann. and Mag. Nat. Hist., XVII, p. 33. Canada.

L. mordax Walck. Tabl. d'Aran., p. 12. Ga., Carolina, N. Y.

——— Walck. Abbot Ga. Spid. Ins. Apt., I, p. 321.

Aranea nissa (Bosc. MSS.) S. l'Araign. Carol., No. 8, pl. 5.

L. nidicola Emerton. N. Engl. Lycos. Trans. Conn. Ac., VI, p. 482, pl. 46, fig. 1. Mass., R. I., Conn., Ind.

L. nidifex (Note 29) Emerton = *arenicola.*

L. nigroventris Emerton. N. Engl. Lycos. Trans. Conn. Ac., VI, p. 488, pl. 47, fig. 5. Mass.

L. ocreata Hentz. Journ. Bost. Soc. Nat. Hist., IV., p. 391. *Id.*, Spid. U. S., ed. Burgess, p. 33, pl. 4, fig. 5. N. C., Ill., Conn., D. C., Va.

——— Keyserling. Am. Citigradæ. Verh. d. z. b. Ges. Wien, 1876, p. 611, pl. 7, fig. 1.

——— Emerton. N. Engl. Lycos. Trans. Conn. Ac., VI, p. 491, pl. 48, fig. 6.

L. philadelphiana Walck. (*Tarentuloides*). Journ. Phil. Ac. Nat. Sci., II, pl. 5, fig. 1. Philadelphia, Ga.

——— Walck. Ins. Apt., I, p. 289.

L. pictilis Emerton. N. Engl. Lycos. Trans. Conn. Ac., VI, p. 485, pl. 46, fig. 5. N. H.

L. pilosa Girard. Marcy's Explor. of the Red River, La., 1852, p. 252, pl. 16, figs. 4, 5. La.

——— Cragin. Contrib. to Knowl. of Arachn. of Kansas. Bull. Washburn Coll., I, No. 4, p. 146.

L. polita Emerton. N. Engl. Lycos. Trans. Conn. Ac., VI, p. 484, pl. 46, fig. 2. Mass., N. Y., Conn.

L. pratensis Emerton. *Ibid*,, p. 483, pl. 46, fig. 4. Mass., Conn., N. H.

L. propinqua Blackw. Spid. fr. Canada. Ann. and Mag. Nat. Hist., XVII, p. 31. Canada.

L. punctulata Hentz. Journ. Bost. Soc. Nat. Hist., IV, p. 390. *Id.*, Spid. U. S., ed. Burgess, p. 31, pl. 3, figs. 16, 17. Ala., Conn., Mass., R. I., Va., D. C., Ga., Fla., Texas.

——— Emerton. N. Engl. Lycos. Trans. Conn. Ac., VI, p. 490, pl. 48, fig. 1.

L. riparia Hentz. Journ. Bost. Soc. Nat. Hist., IV, p. 389. *Id.*, Spid. U. S., ed. Burgess, p. 31, pl. 3, figs. 13, 15. Ala, N. C., Va., S. C., D. C., Ga., W. Va.

——— Cragin. Contrib. to Knowl. of Arachn. of Kansas. Bull. Washburn Coll., I, No. 4, p. 146.

L. rufa Keyserling. Am. Citigradæ. Verh. d. z. b. Ges. Wien, 1876, p. 613, pl. 7, fig. 2. Md., D. C., Va., Ill.

L. rugosa Keyserling. *Ibid.*, p. 624, pl. 7, figs. 9, 10. Md.

L. ruricola Hentz. Journ. Bost. Soc. Nat. Hist., IV, p. 381. *Id.*, Spid. U. S., ed. Burgess, p. 28, pl. 3, figs. 5, 6. Ala., Carolinas, D. C., Va., Md., Pa.

L. saccata (Latr.) Blackw. Spid. fr. Canada. Ann. and Mag. Nat. Hist., XVII, p. 34. Canada.

L. saggitata Hentz. Journ. Bost. Soc. Nat. Hist., IV, p. 391. *Id.*, Spid. U. S., ed. Burgess, p. 32, pl. 4, fig. 3, 4. Ala.

L. saltatrix Hentz. *Ibid.*, p. 387. *Id.*, *ibid.*, p. 28, pl. 3, fig. 7. U. S.

L. saxatilis Hentz. *Ibid.*, p. 392. *Id.*, *ibid.*, p. 34, pl. 4, figs. 9, 10. Ala.

L. sayi Walck. Ins. Apt., I, p. 337. N. Y.

L. scutulata Hentz. Journ. Bost. Soc. Nat. Hist., IV, p. 390. *Id.*, Spid. U.S., ed. Burgess, p. 32, pl. 4, figs. 1, 2. Ala., Conn., D. C., Md., Ill., Wis., Mo., Tex.

——— Emerton. N. Engl. Lycos. Trans. Conn. Ac., VI, p. 491, pl. 48, fig. 2.

L. sinitsra Thorell. Aran. coll. in Colo. Bull. U. S. Geol. Surv. Terr., III, No. 2, p. 517. Colo.

L. sternalis Thorell. *Ibid.*, p. 504. Colo.

L. suspecta Walck (*Tarentula*). Abbot Ga. Spid. Ins. Apt., I, p. 286. Ga.

L. tristis Thorell. Aran. coll. in Colo. Bull. U. S. Geol. Surv. Terr., III, No. 2, p. 510. Colo.

L. triton Walck. Abbot Ga. Spid. Ins. Apt., I, p. 340. Ga.

L. turricola Treat. Harpers' Monthly, April, 1880.

L. uncata Thorell. Aran. coll. in Colo. Bull. Geol. Surv. Terr., III, No. 2, p. 508. Colo.

L. vehemens Walck. Abbot Ga. Spid. Ins. Apt., I, p. 324. Ga.

L. venustula Hentz. Journ. Bost. Soc. Nat. Hist., IV, p. 392. *Id.*, Spid. U. S., ed. Burgess, p. 33, pl. 4, figs. 6, 7. Ala.

L. xerampelina Keyserling. Am. Citigradæ. Verh. d. z. b. Ges. Wien, 1876, p. 622, pl. 7, fig. 8. Ill.

TARENTULA.

Sundeval. Conspectus Arachn., p. 24. 1833.

1848. C. Koch. Die Arachn., XIV, p. 96, subgenus.
1869. Thorell. On Europ. Spid., p. 191.
1876. Keyserling. Am. Citigradæ. Verh. d. z. b. Ges. Wien, p. 610.

T. baltimoriana Keyserling. Am. Citigradæ. Verh. d. z. b. Ges. Wien, 1876, p. 632, pl. 7, fig. 16. Md.

T. inhonesta Keyserling. *Ibid.*, p. 634, pl. 7, fig. 17. N. Am.

T. kochii Keyserling. *Ibid.*, p. 636, pl. 7, fig. 18. Conn., Mass.

——— Emerton (*Lycosa*). N. Engl. Lycos. Trans. Conn. Ac., VI, p. 485, pl. 46, fig. 6.

T. lepida Keyserling. Am. Citigradæ. Verh. d. z. b. Ges. Wien, 1876, p. 631, pl. 7, fig. 15. N. Am.

T. modesta Keyserling. *Ibid.*, p. 626, pl. 7, figs. 11, 12.

T. modesta (Note 30) Thorel = *pudens* Marx.

T. nidifex Marx = *Lycosa arenicola.*

T. pikei Marx. Americ. Naturalist, 1881, p. 348, figs. 4, 5, 6.

T. pudens Marx. (Note 30).

modesta Thorell. Aran. coll. in Colo. Bull. U. S. Geol. Surv. Terr., III, No. 2, p. 520.

T. scalaris Thorell. Aran. coll. in Colo. Bull. U. S. Geol. Surv. Terr., III, No. 2, p. 520.

PIRATA.

Sundeval. Conspectus Arachn., p. 24. 1833.

1848. *Potamia* C. Koch. Die Arachn., XIV, p. 98.
1867. *Potamia* Ohlert. Aran. d. Prov. Preuss., pp. 126, 132.
1869. *Pirata* Thorell. On Europ. Spid., p. 193.
1876. *Pirata* Keyserling. Am. Citigradæ. Verh. d. z. b. Ges. Wien., p. 610.
1885. *Pirata* Emerton. N. Engl. Lycos. Trans. Conn. Ac., VI, p. 492.

P. insularis Emerton. N. Engl. Lycos. Trans. Conn. Ac., VI, p. 492, pl. 48, fig. 8. N. Y.

P. montana Emerton. *Ibid.*, p. 493, pl. 48, fig. 9. N. Y., N. H.,

P. minuta Emerton. *Ibid.*, p. 493, pl. 48, fig. 10. Mass., Conn.

P. piratica Clerk (*Araneus*). Sv. Spindl., p. 102, pl. 5, tab. 4. Mass., Conn., D. C., Va.

——— Emerton. N. Engl. Lycos. Trans. Conn. Ac., VI, p. 492, pl. 48, fig. 7.

Potamia piratica C. Koch. Die Arachn., XV, p. 1, figs. 1413, 1414.

P. prodigiosa Keyserling. Am. Citigradæ. Verh. d. z. b. Ges. Wien, 1876, p. 670, pl. 8, fig. 44.

TROCHOSA.

C. Koch. Die Arachn., XIV, p. 95. 1848.

Arctosa. Id., ibid., p. 94.
Trochosa Thorell. On Europ. Spid., p. 192.
Trochosa Keyserling. Am. Citigradæ. Verh. d. z. b. Ges. Wien, 1876, p. 610.

T. avara Keyserling, Am. Citigradæ. Verh. d. z. b. Ges. Wien, 1876, p. 661, pl. 8, figs. 38, 39. North America.

T. cinerea Fabricius (*Araneus*). Ent. Syst., II, p. 423, 1793. Mass., Conn., Ind.

——— Emerton (*Lycosa*). N. Engl. Lycos. Trans. Conn. Ac., VI, p. 488, pl. 47, fig. 3.

Lycosa lynx Hahn. Die Arachn., II, p. 13, fig. 104.
Lycosa halodroma C. Koch. Die Arachn., V, p. 106, figs. 410, 411.
Arctosa cinera. Id., ibid., XIV, p. 123, fig. 1358.
Arctosa lynx. Id., ibid., p. 133, fig. 1364.

T. helvipes Keyserling. Am. Citigradæ. Verh. d. z. b. Ges. Wien, 1876, p. 659, pl. 8, fig. 37, pl. 7, figs. 35, 36. Md.

T. rubicunda Keyserling. *Ibid.*, p. 133, pl. 8, fig. 40. Md.

T. vafra C. Koch. Die Arachn., XIV, p. 135, figs. 1365, 1366. North America.

PARDOSA.

C. Koch. Die Arachn., XIV, p. 100. 1848.

1867. Ohlert. Aran. d. Prov. Preuss., pp. 127, 136.
1885. Emerton. N. Engl. Lycos. Trans. Conn. Ac., VI, p. 494.

P. albomaculata Emerton. N. Engl. Lycos. Trans. Conn. Ac., VI, p. 495, pl. 48, fig. 3. N. H.
P. albopatella Emerton. *Ibid.*, p. 497, pl. 49, fig. 2. Mass., Conn.
P. bilineata Emerton. *Ibid.*, p. 496, pl. 49, fig. 4. Conn.
P. brunnea Emerton. *Ibid.*, p. 495, pl. 48, fig. 4. N. H., Mass., Conn.
P. californica Keyserling. N. Spinn. a. Am., VII. Verh. d. z. b. Ges. Wien, 1887, p. 483 (63), pl. 6, fig. 44. Cal.
P. lapidicina Emerton. N. Engl. Lycos. Trans. Conn. Ac., VI, p. 494, pl. 48, fig. 5. Mass., Conn.
P. montana Emerton. *Ibid.*, p. 498, pl. 49, fig. 5. N. H.
P. nigropalpis Emerton. *Ibid.*, p. 497, pl. 49, fig. 1. Mass., Conn.
P. pallida Emerton. *Ibid.*, p. 496, pl. 49, fig. 3. N. H., Mass., Conn.
P. tristis Keyserling. N. Spinn. a. Am., VII. Verh. d. z. b. Ges. Wien, 1887, p. 485 (65), pl. 6, fig. 45. Saskatchawan River.

AULONIA.

C. Koch. Die Arachn., XIV, p. 97. 1848.

1876. Simon. Arachn. de France, III, p. 358.
1885. Emerton. N. Engl. Lycos. Trans. Conn. Ac., VI, p. 498.

A. aurantiaca Emerton. N. Engl. Lycos. Trans. Conn. Ac., VI, p. 499, pl. 49, fig. 6. Mass., Conn., D. C., Va., Md.

OCYALE (Note 31).

Sav. and *Aud.* Descr. de l'Egypt, XXII, p. 372. 1825-27.

1845. *Micrommata* Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 192 *ad part.*
1861. *Ocyale* Westr. Aran. Suec., p. 536.
1864. *Ocyale* Simon. Hist. Nat. d'Araign., p. 351.
1869. *Ocyale* Thorell. On Europ. Spid. p. 194.
1876. *Ocyale* Keyserling. Am. Citigradæ. Verh. d. z. b. Ges. Wien, p. 610.
1885. *Ocyale* Emerton. N. Engl. Lycos. Trans. Conn. Ac., VI., p. 499.

O. rufa C. Koch. Die Arachn., XIV, p. 112, fig. 1349. Pa., Ga.
O. undata Hentz (*Micrommata*). Journ. Bost. Soc. Nat. Hist., V, p. 192. *Id.*, Spid. U. S., ed. Burgess, p. 42, pl. 6, fig. 7. Ala., Mass., Conn., Pa., Md., D. C., Va., Ga.
—— Emerton. N. Engl. Lycos. Trans. Conn. Ac., VI, p. 499, pl. 49, fig. 7.
Micrommata carolinensis Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 194. *Id.*, Spid. U. S., ed. Burgess, p. 44, pl. 6, fig. 9.
Micrommata serrata Hentz. *Ibid.*, p. 193. *Id.*, *ibid.*, p. 43, pl. 6, fig. 9.

DOLOMEDES.

Latreille. Nouv. Diction. d'Hist. Nat., XXIV, p. 135. 1804.

1861. Westr. Aran. Suec., p. 534.
1861 Blackw. Spid. of Gr. Brit., I, p. 37 *ad part.*
1876. Keyserling. Am. Citigradæ. Verh. d. z. b. Ges. Wien, p. 610.
1876. Simon. Arachn. de France, III, p. 228.
1885. Emerton. N. Engl. Lycos. Trans. Conn. Ac., VI, p. 500.

D. ærugineus C. Koch. Die Arachn., XIV, p. 122, fig. 1357. N. Am.
D. albineus Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 189. *Id.*, Spid. U. S., ed. Burgess, p. 39, pl. 6, fig. 7. Ala., Ga.
D. binotatus C. Koch. Die Arachn., XIV, p. 121, fig. 1356. N. Am.
D. connexus Giebel. Spinn. a. Illinois. Zeitschr. f. ges. Naturwiss., XXXIII, p. 252. Ill.
D. fontanus Emerton. N. Engl. Lycos. Trans. Conn. Ac., VI, p. 502, pl. 49, fig. 10. N. H.
D. hastatulus Hentz. Journ. Bost. Soc. Nat. Hist., IV, p. 395. *Id.*, Spid. U. S., ed. Burgess, p. 37, pl. 4, fig. 9. Ala.
D. lanceolatus Hentz. *Ibid.*, V. p. 191. *Id.*, *ibid.*, p. 40, pl. 7, fig. 12. Mass., Ala., N. C., S. C.
D. lineatus Walck. Abbot Ga. Spid. Ins. Apt., I, p. 347. Ga.
D. mirus Walck. *Ibid.*, p. 357. Ga.
D. rufus Walck. *Ibid.*, p. 351. Ga.
D. scapularis C. Koch. Die Arachn., XIV, p. 119, fig. 1354. Pa., La.
——— Keyserling. Am. Citigradæ. Verh. d. z. b. Ges. Wien, 1876, p. 676, pl. 8, fig. 49.
D. scriptus Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 189. *Id.*, Spid. U. S., ed. Burgess, p. 38, pl. 6, fig. 1. Ala.
D. sexpunctatus Hentz. *Ibid.*, V, p. 191. *Id.*, *ibid.*, p. 41, pl. 6, figs. 5–6. N. C., Mass., N. Y., N. H., Pa., Md., D. C., Va.
——— Emerton. N. Engl. Lycos. Trans. Conn. Ac., VI, p. 501, pl. 49, fig. 8.
D. striatus Giebel. Spinn. a. Ill. Zeitschr. f. ges. Naturwiss, XXXIII, p. 252. Ill.
D. tenax Hentz. Journ. Bost. Soc. Nat. Hist., IV, p. 395. *Id.*, Spid. U. S., ed. Burgess, p. 37, pl. 5, fig. 7. N. C.
D. tenebrosus (Note 32) Hentz. *Ibid.*, IV, p. 396. *Id.*, *ibid.*, p. 38, pl. 5, fig. 10–13. N. C., Ala., Mass., Pa., Md., D. C., Va., Ga.
——— Emerton. N. Engl. Lycos. Trans. Conn. Ac., VI, p. 501, pl. 49, fig. 9.
D. urinator Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 190. *Id.*, Spid. U. S., ed. Burgess, p. 40, pl. 6, fig. 3. N. C., Ala., Mass., Md., D. C., Va., W. Va.
D. virgatus Walck. Abbot Ga. Spid. Ins. Apt., I, p. 358. Ga.
D. vittatus Walck. *Ibid.*, p. 347. Ga.

Family OXYOPIDÆ.

1869. *Oxyopoidæ* Thorell. On Europ. Spid., p. 196.
1876. *Oxyopidæ* Simon. Arachn. de France, III, p. 214.

PEUCETIA.

Thorell. On Europ. Spid., p. 196. 1869.

1858. *Pasithea* Blackw. Descr. of six Spid., p. 427.

P. aurora McCook. Proc. Ac. Nat. Sc., Phila., 1883, p. 276, Cal.
P. viridans Hentz (*Oxyopes*). Journ. Bost. Soc. Nat. Hist., V, p. 195. *Id.*, Spid. U. S., ed. Burgess, p. 46, pl. 7, fig. 2. Fla., N. C., Ala., Miss., La., Cal.

OXYOPES.

Latreille. Nouv. Dict. d'Hist. Nat., XXIV, p. 135. 1804.

1805. *Sphasus* Walck. Tabl. d'Aran., p. 19.
1832. *Oxyopes* Hentz. Am. Journ. of Science and Art, XXI, p. 105.
1837. *Sphasus* Walck. Ins. Apt., 1, p. 373.
1861. *Sphasus* Blackw. Spid. of Gr. Brit., 1, p. 43.
1845. *Oxyopes* Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 195.
1875. *Oxyopes* Hentz. Spid. U. S., ed. Burgess, p. 45.
1885. *Oxyopes* Emerton. N. Engl. Lycos. Trans. Conn. Ac., VI, p 502.

O. arcuatus Walck. (*Sphasus*). Abbot Ga. Spid. Ins. Apt., 1, p. 378. Ga.
O. astutus Hentz. Journ. Bost. Soc. Nat. Hist., v, p. 197. *Id.*, Spid. U. S., ed. Burgess, p. 48, pl. 7, fig. 1. Ala., Va.
O. fossanus Walck. (*Sphasus*). Abbot Ga. Spid. Ins. Apt., 1, p. 377. Ga.
O. gracilis Keyserling = *salticus*.
O. lanceolatus Walck. (*Sphasus*). Abbot Ga. Spid. Ins. Apt., 1, p. 377. Ga.
O. salticus Hentz. Journ. Bost. Soc. Nat. Hist., v, p. 196. *Id.*, Spid. U. S., ed. Burgess, p. 47, pl. 6, fig. 10. Fla., Tex., La., Miss., Ga., S. C., Va., D. C., Md.
gracilis Keyserling. Am. Citigradæ. Verh. d. z. b. Ges. Wien, 1376, p. 698, pl. 8, fig. 63, 64.

O. scalaris Hentz. Journ. Bost. Soc. Nat. Hist., v, p. 196. *Id.*, Spid. U. S., p. 47, pl. 7, fig. 4. N. H., Va., D. C., Md.
——— Emerton. N. Engl. Lycos. Trans. Conn. Ac., VI, p. 502, pl. 49, fig. 11.
O. vittata Walck. (*Sphasus*). Abbot Ga. Spid. Ins. Apt., I, p. 378. Ga.

Family PODOPHTHALMIDÆ.

1877. Cambridge. Proc. Lond. Zool. Soc., III, p. 566.
1878. Karsch. Zeitschr. f. ges. Naturwiss., LI, p. 327.

TETRAGONOPHTHALMA.

Karch. Zeitsch. f. ges. Naturwiss., LI, p. 329. 1878.

Thomisus Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 443, *ad part.*

T. dubia Hentz. (*Thomisus*). Journ. Bost. Soc. Nat. Hist., V, p. 448. *Id.*, Spid. U. S., ed. Burgess, p. 82, pl. 10, fig. 11. N. C.
T. tenuis Hentz. (*Thomisus*). *Ibid.*, p. 449. *Id.*, *ibid.*, p. 82, pl. 10, fig. 12. Ala.
T. undulata Keyserling. N. Spinn. a. Am., VII. Verh. d. z. b. Ges. Wien, 1887, p. 486, (66), pl. 6, fig. 42. Fla.

Family CTENIDÆ

Keyserling. Am. Citigradæ. Verh. d. z. b. Ges. Wien, 1876, p. 680.

CTENUS.

Walck. Tabl. d'Aran., p. 16, 1805.

1844. Hentz. Journ. Bost. Soc. Nat. Hist., IV, p. 393.
1875. Hentz. Spid. U. S., ed. Burgess, p. 34.

C. hibernalis Hentz. Journ. Bost. Soc. Nat. Hist., IV, p. 393. *Id.*, Spid. U.S., ed. Burgess, p. 35, pl. 5, figs. 1–4. Ala., N. Mex.
C. punctulatus Hentz. *Ibid.* Ahin., p. 393. *Id.*, *ibid.*, p. 35, pl. 5, figs. 5, 6. Ala., Tex., Ariz.

Tribus X SALTIGRADÆ.

Family ATTIDÆ.

1817. *Saltigrades* Latreille. Cuvier's Règne anim., III, p. 98.
1823. *Saltatores* Sundev. Gen. Aran. suec., p. 20.
1833. *Attidæ* Sundev. Conspect. Arachn., p. 25.
1850. *Attides* C. Koch. Uebers d. Arachn. Syst., V, p. 42.
1869. *Attoidæ* Thorell. On Europ. Spid., p. 203.
1887. *Salticoidæ* Thorell. Ragni. Birmani. Ann. Mus., CIV, Genoa. XXV.

Subfamily ATTINÆ.

PHIDIPPUS.

C. Koch. Uebers d. Arachn. Syst., V, p. 53. 1850.

1885. Peckham. Gen. Fam. Attidæ. Wisc. Acad., p. 298.
1887. Peckham. Attidæ of North America. *Ibid.*, separate, p. 11.

P. albomaculatus Keyserling. N. Spinn. a. Am., VI. Verh. d. z. b. Ges. Wien, 1884, p. 491, pl. 13, fig. 2. N. H., Mass., Cal.

——— Peckham. Att. of N. A., p. 19, pl. 1, fig. 3.

P. alchymista Koch = *morsitans.*

P. arizonensis Peckham (*Attus*). Descr. Att. U. S., p. 13, pl. 2, fig. 10. *Id.*, Att. of N. A., p. 18, pl. 1, fig. 10. Ariz., Tex., Cal.

P. asinarius C. Koch = *galathea.*

P. auctus C. Koch = *Philæus rimator.*

P. bicolor Keyserling. N. Spinn. a. Am., VI. Verh. d. z. b. Ges. Wien, 1884, p. 496, pl. 13, fig. 6. Utah.

P. cardinalis Hentz (*Attus*). Journ. Bost. Soc. Nat. Hist., V, p. 200. *Id.*, Spid. U. S., ed. Burgess, p. 51, pl. 7, fig. 9. Southern U. S.

——— Peckham (*Attus*). Descr. Att. U. S., p. 31, pl. 3, fig. 24. *Id.*, Att. N. A., p. 15, pl. 2, fig. 4.

P. carolinus C. Koch. Die Arachn., XIII, p. 136, fig. 1194. Carolina.

P. castrensis C. Koch. *Ibid.*, p. 140, fig. 1198. Pa.

P. clarus Keyserling. N. Spinn. a. Am., VI. Verh. d. z. b. Ges. Wien, 1884, p. 497, pl. 13, fig. 7. Md.

P. coloradensis Thorell. = *insolens.*

P. concinnatus C. Koch. Die Arachn., XIII, p. 145, fig. 1202. Pa., Md.

P. dubiosus C. Koch. *Ibid.*, p. 144, fig. 1201. Pa.

P. elegans C. Koch. *Ibid.*, p. 143, fig. 1200. Pa.

P. galathea Walck. (*Attus*). Abbot Ga. Spid. Ins. Apt., I, p. 456. *Ibid.*, IV, p. 423. Ga., Eastern States.

——— Peckham. Att. N. A., p. 14, pl. 1, fig. 3.

Attus mystaceus Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 355. *Id.*, Spid. U. S., ed. Burgess, p. 58, pl. 8, fig. 9.

Phidippus asinarius C. Koch. Die Arachn., XIII, p. 139, fig. 1197.

P. gracilis Keyserling. N. Spinn. a. Am., VI. Verh. d. z. b. Ges. Wien, 1884, p. 495, pl. 13, fig. 5. Ky.

P. insigniarius C. Koch. Die Arachn., XIII, p. 150, fig. 1206. Pa.

P. insolens Hentz (*Attus*). Journ. Bost. Soc. Nat. Hist., V, p. 200. *Id.*, Spid. U. S., ed. Burgess, p. 51, pl. 7, fig. 8. N. C., Ga., Fla., Colo.

——— Peckham. Att. N. A., p. 23, pl 1, fig, 12.

Attus podagrosus Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 357. *Id.*, Spid. U. S., ed. Burgess, p. 61, pl. 8, fig. 13.

Phidippus coloradensis Thorell. Arachn. coll. in Color. Bull. U. S. Geol. Surv. Terr., III, No. 2, p. 523.

P. johnsoni Peckham (*Attus*). Descr. Att. U. S., p. 22, pl. 2, fig. 17. *Id.*, Att. N. A., p. 20, pl. 1, fig. 14. Wash.

P. lunulatus C. Koch = *morsitans*.

P. McCookii Peckham (*Attus*). Descr. Att. U. S., p. 16, pl. 2, fig. 12. *Id.*, Att. N. A., p. 17, pl. 2, fig. 9. Pa.

P. mexicanus Peckham. Att. of N. A., p. 23, pl. 2, fig. 7. Ariz.

P. miniatus Peckham (*Attus*). Descr. Att. U. S., p. 15, pl. 1, fig. 6. *Id.*, Att. N. A., p. 15, pl. 1, fig. 6. Fla., Tex.

P. morsitans Walck. (*Attus*). Abbot Ga. Spid. Ins. Apt., I, p. 432. *Ibid.*, IV, p. 419. U. S.

——— Peckham. Att. of N. A., p. 11, pl. 1, fig. 1.

Attus audax Hentz. Journ. Bost. Soc. Nat. Hist., V., p. 199. *Id.*, Spid. U. S., ed. Burgess, p. 50, pl. 7, figs. 6, 7.

Attus tripunctatus. *Id.*, *ibid.*, p. 355. *Id.*, *ibid.*, p. 58, pl. 8, fig. 8.

Attus tripunctatus Peckham. Descr. Att. U. S., p. 33, pl. 3, fig. 25.

Phidippus alchymista C. Koch. Die Arachn, XIII, p. 131, fig. 1190.

Phidippus lunulatus C. Koch. *Ibid.*, p. 133, fig. 1192.

Phidippus mundulus C. Koch. *Ibid.*, p. 137, fig. 1196.

Phidippus purpurifer C. Koch. *Ibid.*, p. 127, fig. 1187.

Phidippus rufimanus C. Koch. *Ibid.*, p. 132, fig. 1191.

Phidippus smaragdifer C. Koch. *Ibid.*, p. 128, fig. 1188.

Phidippus variegatus C. Koch. *Ibid.*, p. 125, fig. 1186.

P. mundulus C. Koch = *morsitans*.

P. obscurus Peckham. Att. of N. A., p. 16, pl. 1, fig. 5. Tex., D. C.

P. octopunctatus Peckham (*Attus*). Descr. Att. U. S., p. 6, pl. 1, fig. 4. *Id.*, Att. N. A., p. 21, pl. 2, fig. 15. Mo.

P. opifex McCook (*Attus*). Proc. Ac. Nat. Sci., Phila., 1878, p. 276. Cal.

——— Peckham. Att. N. A., p. 20, pl. 2, fig. 11.

P. otiosus Hentz (*Attus*). Journ. Bost. Soc. Nat. Hist., V, p. 356. *Id.*, Spid. U. S., ed. Burgess, p. 59, pl. 8, fig. 10. Ga., Ala.

——— Peckham. Att. N. A., p. 25, pl. 1, fig. 15.

P. paludatus C. Koch. Die Arachn., XIII, p. 149, fig. 1205. Carolina.

P. pulcherrimus Keyserling. N. Spinn. a. Am., VI. Verh. d. z. b. Ges. Wien, 1884, p. 492, pl. 13, fig. 3. Fla.

P. personatus C. Koch. Die Arachn., XIII, p. 141, fig. 1199. Pa.

P. purpuratus Keyserling. N. Spinn. a. Am., VI. Verh. d. z. b. Ges. Wien, 1884, p. 489, pl. 13, fig. 1. Me., Mass., Utah.

P. purpurifer C. Koch = *morsitans*.

P. rauterbergii Peckham. Att. N. A., p. 22, pl. 1, fig. 8. Tex.

P. ruber Keyserling = *rufus*.

P. rufimanus C. Koch = *morsitans*.

P. rufus Hentz (*Attus*). Journ. Bost. Soc. Nat. Hist., V, p. 356. *Id.*, Spid. U. S., ed. Burgess, p. 60, pl. 8, fig. 12. U. S.

——— Peckham. Att. N. A., p. 13, pl. 1, fig. 2.

Attus castaneus Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 353. *Id.*, Spid. U. S., ed. Burgess, p. 55, pl. 8, fig. 4.

Plexippus rufus C. Koch. Die Arachn., XIII, p. 120, fig. 1180.

Plexippus bivittatus C. Koch. *Ibid.*, p. 120, fig. 1181.

Phidippus ruber Keyserling. N. Spinn. a. Am., VI. Verh. d. z. b. Ges. Wien, 1884, p. 493, pl. 13, fig. 4.

P. smaragdifer C. Koch = *morsitans*.

P. testaceus C. Koch. Die Arachn., XIII, p. 160, fig. 1225. Pa.

P. togatus C. Koch. *Ibid.*, p. 129, fig. 1189. Pa.

P. variegatus C. Koch = *morsitans*.

PHILÆUS.

Thorell. On Europ. Spid., p. 217. 1869.

1885. Peckham. Gen. Fam. Att. Wis. Acad., p. 299.
1887. Peckham. Att. of N. A. *Ibid.*, p. 25.

P. chrysis Walck. (*Attus*). Abbot Ga. Spid. Ins. Apt., I, p. 454. S. C., Ga.
——— Peckham. Att. N. A., p. 30, pl. 1, fig. 20.
Attus iris Walck., ♀. Abbot Ga. Spid. Ins. Apt., I, p. 455.
Plexippus orichalceus C. Koch. Die Arachn., XIII, p. 113, fig. 1174.
P. farneus Peckham. Att. N. A., p. 26, pl. 2, fig. 16. Tex.
P. fartilis Peckham. *Ibid.*, p. 27, pl. 2, fig. 17. Ariz.
P. militaris Hentz (*Attus*). Journ. Bost. Soc. Nat. Hist., V, p. 201. *Id.*, Spid. U. S., ed. Burgess, p. 62, pl. 7, figs. 10, 11. U. S.
——— Peckham. Att. N. A., p. 28, pl. 1, fig. 19.
Eris aurigera, ♂, C. Koch. Die Arachn., XIII, p. 189, fig. 1237.
Phidippus asinarius C. Koch (Peckham's quotation)?
P. princeps Peckham (*Attus*). Descr. Att. U. S., p. 18, pl. 2, fig. 14. Pa.
——— Peckham. Att. N. A., p. 31, pl. 3, fig. 21.
P. rimator Walck. (*Attus*). Abbot Ga. Spid. Ins. Apt., I, p. 446 Pa., Fla., Ga., Iowa.
——— Peckham. Att. N. A., p. 32, pl. 1, fig. 22.
Phidippus auctus C. Koch. Die Arachn., XIII, p. 148, fig. 1204.

PLEXIPPUS.

C. Koch. Uebers d. Arachn. Syst., V, p. 51. 1850.

1885. Peckham. Genera Fam. Att. Wis. Ac., p. 296.
P. albovittatus C. Koch. Die Arachn., XIII, p. 118, fig. 1178. Pa.
P. bivittatus C. Koch. *Ibid.*, p. 120, fig. 1181. Pa.
P. puerperus Hentz (*Attus*). Journ. Bost. Soc. Nat. Hist., V, p. 360. *Id.*, Spid. U. S., ed. Burgess, p. 64, pl. 8, fig. 22. Cal., Tex., Fla., Ga.
——— Peckham. Att. N. A., p. 33, pl. 1, fig. 23.
Alcmena pallida C Koch. Die Arachn. XIII, p. 179, fig. 1229.
Attus agrestis Peckham. Descr. of Att. of U. S., p. 12, pl. 1, fig. 9.
P. putnami Peckham (*Attus*). Descr. Att. U. S., p. 1, pl. 1, fig. 1. *Id.*. Att. N. A., p. 35, pl. 3, fig. 24. Iowa.
P. rufus C. Koch. Die Arachn., XIII, p. 120, fig. 11 0. Pa.
P. undatus C. Koch = *Astia vittata*.

DENDRYPHANTES.

C. Koch. Uebers d. Arachn. Syst., I, p. 31. 1837.

1885. Peckham. Genera Fam. Att. Wis. Ac., p. 293.

D. alboimaculatus Peckham (*Attus*). Descr. Att. U. S., p. 24, pl. 2, fig. 19. *Id.*, Att. N. A., p. 41, pl. 3, fig. 29. Iowa, N. Y.
D. capitatus Hentz (*Attus*). Journ. Bost. Soc. Nat. Hist., V, p. 200. *Id*, Spid. U. S., ed. Burgess, p. 51, pl. 7, fig. 15. U. S.
——— Peckham. Att. N. A., p. 36, pl. 1, fig. 25.
Attus parvus Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 358. *Id.*, Sp. U. S., ed. Burgess, p. 62, pl. 8, fig. 17.
Attus æstivalis Peckham. Descr. Att. U. S., p. 2, pl. 1, fig. 2.

D. elegans Hentz. Journ. Bost. Soc. Nat. Hist., v, p. 353. *Id.*, Spid. U. S., ed. Burgess, p. 56, pl. 8, fig. 6, ♀. Middle, Eastern, and Southern States.
——— Peckham. Att. N. A., p. 37, pl. 3, fig. 20.
Attus superciliosus Hentz. Journ. Bost. Soc. Nat. Hist., v, p. 364. *Id.*, Spid. U. S., ed. Burgess, p. 68, pl. 9, fig. 11.
Maevia cristata C. Koch. Die Arachn., XIV, p. 70, fig. 1326.
Attus tibialis Peckham. Descr. Att. U. S., p. 11, pl. 1, fig. 8.
D. flavipedes Peckham. Att. N. A., p. 42, fig. 20, pl. 3. Canada.
D. flavus Peckham. *Ibid.*, p. 39, pl. 1, fig. 27. N. Y.
D. multicolor Hentz. Journ. Bost. Soc. Nat. Hist., v, p. 202. *Id.*, Spid. U. S., ed. Burgess, p. 53, pl. 7, fig. 13. Pa., Ala.
——— Peckham. Att. N. A., p. 40, pl. 3, fig. 28.

ICIUS.

Simon. Arachn. de France, III, p. 54. 1876.

1885. Peckham. Genera Fam Att. Wis., Ac., p. 306.

I. albovittatus Keyserling. N. Spinn. a. Am., VI. Verh. d. z. b. Ges. Wien, 1884, p. 502, pl. 13, fig. 10. Mass.
——— Peckham. Att. N. A., p. 50, pl. 1, fig. 35.
I. crassiventer Keyserling. N. Spinn. a. Am., VI. Verh. d. z. b. Ges. Wien, 1884, p. 503, pl. 13, fig. 11. Mass.
I. elegans Keyserling. *Ibid.*, p. 499, pl. 13, fig. 8. N. A.
I. lineatus C. Koch (*Mœvia*). Die Arachn., XIV, p. 77, fig. 1332. Pa., Wis., Ga.
Attus quadrilineatus Peckham. Descr. Att.. U. S., p. 19, pl. 2, fig. 15.
I. mitratus Hentz (*Attus*). Journ. Bost. Soc. Nat. Hist., v, p. 363. *Id.*, Spid. U. S., ed. Burgess, p. 68, pl. 9, fig. 9. Wis., Pa., N. C., Ala., Ga., Fla.
——— Peckham. Att. N. A., p. 49, pl. 1, fig. 34.
Attus morigerus Hentz. Journ. Bost. Soc. Nat. Hist., v, p. 365. *Id.*, Spid. U.S., Burgess, p. 69, pl. 9, fig. 12.
Mœvia pallida C. Koch. Die Archn., XIV, p. 79. Pa.
I. nigromaculatus Keyserling. N. Spinn. a. Am., VI. Verh. d. z. b. Ges. Wien, 1884, p. 500, pl. 13, fig. 9. Utah.
I. palmarum Hentz (*Epiblemum*). Journ. Bost. Soc. Nat. Hist., v, p. 366. *Id.*, Spid. U. S., ed Burgess, p. 71, pl. 9, fig. 16. N. Y., N. C., S. C., Ala , Fla., V., D. C., Md.
——— Peckham (*Epiblemum*). Descr. Att. U. S., p. 28, pl. 3, fig. 22. *Id.*, Att. N.A., p. 46, pl. 1, fig. 33.
I. piraticus Peckham. Att. N. A., p. 49, pl. 1, fig. 35. Tex.
I. vittatus Keyserling. N. Spinn. a. Am., VI. Verh. d. z. b. Ges. Wien, 1884, p. 504, pl. 13, fig. 12. N. A.

PSEUDICIUS.

Simon. Faune Arachn. de l' Asie mer. Bull. Soc. Ent., France, p. x, 1885.

1885. Peckham. Genera Fam. Att. Wis. Ac., p. 336.

P. hardfordii Peckham. Att. of N. A., p. 51, pl. 1, fig. 36. Cal.

SADALA.

Peckham. Att. of N. A., p. 52. 1888.

S. distincta Peckham. Att. of N. A., p. 53, pl. 1, fig. 70. N. Mex.

ERIS.

C. Koch. Die Arachn., XIII, p. 189. 1846.

1850. C. Koch. Uebers d. Arachn. Syst., V, p. 59.
1876. Simon. Arachn. de France, III, p. 197.
1880. Karsch. Arachn. Bl., VIII, Zeitschr. f. ges. Naturwiss., p. 397.
1885. Peckham. Genera Fam. Att., p. 284.

E. nervosus Peckham. Att. of N. A., p. 56, pl. 1, fig. 39. N. Y.
E. octavus Hentz (*Attus*). Journ. Bost. Soc. Nat. Hist., v, p. 365. *Id.*, Spid. U. S., ed. Burgess, p. 70, pl. 9, fig. 15, N. Y., Ala., N. C., Ga.
——— Peckham. Att. of N. A., p. 54, fig. 37.

HASARIUS.

Simon. Arachn. d. France, III, p. 77. 1876.

1855. Peckham. Genera Fam. Att. Wis. Ac. Sc., etc., p. 312.

H. hoyi Peckham (*Attus*). Descr. of Att. U. S., p. 7, pl. 1, fig. 5. Pa., N. Y., Wis.
——— Peckham. Att. of N. A., p. 57, pls. 1, 4, fig. 40.

Attus pinus Peckham. Descr. of Att. of U. S., p. 20, pl. 2, fig. 16.

HABROCESTUM.

Simon. Arachn. d. France, III, p. 131. 1876.

1885. Peckham. Genera Fam. Att. Wis. Ac. Sc., etc., p. 316.

H. auratum Hentz (Attus). Journ. Bost. Soc. Nat. Hist., v, p. 362. *Id.*, Spid. U. S., ed. Burgess, p. 66, pl. 9, fig. 6. N. Y., S. C., Ga.
——— Peckham. Att. of N. A., p. 63, pls. 1, 4, fig. 46.
H. coecatum Hentz (*Attus*). Journ. Bost. Soc. Nat. Hist., v, p. 361. *Id.*, Spid. U. S., ed. Burgess, p. 65, pl. 9, fig. 2. Pa., N. Y., Ala.
——— Peckham. Att. of N. A., p. 60, pls. 1, 4, fig. 42.
H. coronatum Hentz (*Attus*). Journ. Bost. Soc. Nat. Hist., v, p. 361. *Id.*, Spid. U. S., ed. Burgess, p. 64, pl. 9, fig. 1. Pa., Ala., Iowa.
——— Peckham. Att. of N. A., p. 59.
H. cristatum Hentz (*Attus*). Journ. Bost. Soc Nat. Hist., v, p. 363. *Id.*, Spid. U. S., ed. Burgess, p. 67, pl. 9, fig. 8. N. Y., Ala., Conn.
——— Peckham. Att. of N. A., p. 62, pls. 1, 4, fig. 45.
H. hirsutum Peckham. Att. of N. A., p. 64, pl. 4, fig. 47. Oregon.
H. oregonense Peckham. *Ibid.*, p. 66, pl. 5, fig. 49. Oregon.
H. peregrinum Peckham (*Attus*). Descr. of Att. of U. S., p. 17, pl. 2, fig. 13. N. Y., Conn.
——— Peckham. Att. of N. A., p. 6, pls. 1, 4, fig. 44.
H. splendens Peckham (*Attus*). Descr. of Att. of U. S., p. 4, pl. 1, fig. 3. Wis., Mass.
——— Peckham. Att. of N. A., p. 65, pls. 1, 5, fig. 48.
Pellenes nigriceps Keyserling. N. Spinn. a. Am., VI. Verh. d. z. b. Ges Wien, 1885, p. 512, pl. 13, fig. 17.

H. viridipes Hentz (*Attus*). Journ. Bost. Soc. Nat. Hist., v, p. 362 *Id.*, Spid. U. S., ed. Burgess, p. 66, pl. 9, fig. 5. Tex., S. C.
——— Peckham. Att. of N. A., p. 60, pls. 1, 4, fig. 43.

SAITIS.

Simon. Arachn. d. France, III, p. 168. 1876.

1882. *Thorellia* L. Koch in Keyserling Arachn. Austral., p. 1352.
1883. *Saitis.* *Id.*, *ibid.*, p. 1434.
1885. Peckham. Genera of Fam. Att. Wis. Ac. Sc., etc., p. 321.

S. pulex Hentz (*Attus*). Journ. Bost. Soc. Nat. Hist., v, p. 361. *Id.*, Spid. U. S., ed. Burgess, p. 65, pl. 9, fig. 3. N. Y., Pa., Wis., Iowa, Tenn., Ala.
——— Peckham. Att. of N. A., p. 67, pls. 1, 5, fig. 50.
Euophrys offuscata ? C. Koch. Die Arachn., XIII, p. 218, fig. 1263.
Cyrba pulex Keyserling. N. Spinn. a. Am., VI. Verh. d. z. b. Ges. Wien, 1885, p. 509, pl. 13, fig. 15. Mass., N. Y., Pa., Wis., Iowa, Tenn., Ala.
S. notata Keyserling. N. Spinn. a. Am., VI. Verh. d. z. b. Ges. Wien, 1885, p. 510, pl. 13, fig. 16. Ky.

PROSTHECLINA.

Keyserling. Arachn. Austral., p. 1368. 1882.

P. cambridgii Peckham. Att. of N. A., p. 69, pls. 1, 5, fig. 51. Fla.

ASTIA.

L. Koch. Arachn. Austral., p. 1152. 1879.

1885. Peckham. Genera of the Fam. Att. Wis. Ac. Sc., etc., p. 332.

A. morosa Peckham. Att. of N. A., p. 71, pls. 1, 5, fig. 53. Cal.
A. vittata Hentz (*Attus*). Journ. Bost. Soc. Nat. Hist., v, p. 360. *Id.*, Spid. U. S., ed. Burgess, p. 64, pl. 8, fig. 23. U. S.
——— Peckham. Att. of N. A., p. 70, pls. 1, 5, fig. 52.
Plexippus undatus C. Koch. Die Arachn., XIII, p. 123, fig. 1183.
Mævia pencillata. *Id.*, *ibid.*, XIV, p. 69, fig. 1325.
Attus niger Hentz. Journ. Bost. Soc. Nat. Hist., v, p. 359. *Id.*, Spid. U. S., ed. Burgess, p. 63, pl. 8, fig. 19.

MÆVIA.

C. Koch. Uebers d. Arachn. Syst., v, p. 50. 1850.

1885. Peckham. Genera of Fam. Att. Wis. Ac. Sc., etc., p. 308.

M. annulipes C. Koch. Die Arachn., XIV, p. 80, fig. 1335. Pa.
M. aurulenta C. Koch. *Ibid.*, p. 84, fig. 1338. Pa.
M. californica Peckham. Att. of N. A., p. 73, pl. 5, fig. 54. Cal.
M. chrysea C. Koch = *Homalattus cyaneus.*
M. cristata C. Koch = *Dendryphantes elegans.*
M. lineata C. Koch = *Icius lineatus.*
M. pallida C. Koch = *Icius mitratus.*
M. pennicillata C. Koch = *Saitis pulex.*
M. sulfurea C. Koch. Die Arachn., XIV, p. 71, fig. 1327. Pa.
M. tibialis C. Koch. *Ibid.*, p. 78, fig. 1333. Pa.

CYTÆA.

Keyserling. Arachn. Austral., p. 1380. 1882.

1885. Peckham. Genera of the Fam. Att. Wis. Ac. Sc., etc., p. 331.

C. minuta Peckham. Att. of N. A., p. 73, pls. 1, 5, fig. 55. Cal.

CYRBA.

Simon. Arachn. d. France, III, p. 165. 1876.

1882. Keyserling. Arachn. Austral., p. 1436.
1885. Peckham. Genera of the Fam. Att. Wis. Ac. Sc., etc., p. 318.

C. pulex Keyserling = *Saitis pulex.*
C. tæniola Hentz (*Attus*). Journ. Bost. Soc. Nat. Hist., V, p. 353. *Id.*, Spid. U. S., ed. Burgess, p. 56, pl. 8, fig. 5. Pa., S. C., Ala., Ga., Fla., Wis.
—— Peckham. Att. of N. A., p. 75, pls. 1, 4, 5, fig. 56.

EPIBLEMUM.

Hentz. Am. Journ. of Science and Art, XXI, p. 108. 1832.

1837. *Caliethera* C. Koch. Uebers de Arachn. Syst., 1, p. 30.
1864. *Cyrtonota* Simon. Hist. Nat. d'Araign, p. 324.
1876. *Caliethera.* *Id.*, Arachn. de France, III, p. 62.
1875. *Epiblemum* Hentz. Spid. U. S., ed. Burgess, p. 11, p. 70.
1885. *Epiblemum* Peckham. Genera of the Fam. Att. Wis. Ac. Sc., etc., p. 311.

E. faustum Hentz = *scenicum.*
E. palmarum Hentz = *Icius palmarum.*
E. scenicum Clerk (*Araneus*). Sv. Spindl., p. 117, pl. 5, tab. 13, 1757. N. A.
—— Peckham. Att. of N. A., p. 76, pls. 1, 4, fig. 57.
Aranea scenica Linn. Syst. Nat. Ed., X, p. 623.
Aranea albofasciata De Geer. Mem., VII, p. 287 *ad part.*
Attus scenicus Walck. Tabl. d'Aran., p. 24 *ad part.*
Salticus scenicus Latr. Gen. Crust. et Ins. 1, p. 123 *ad part.*
Salticus scenicus Hahn. Die Arachn., 1, p., 57, figs. 43, 44 *ad part.*
Epiblemum faustum Hentz. Am. Journ. Sci. and Arts, XXI, p. 108.
Attus scenicus Sund. Sv. Spindl. in Vet. A. K. Handl., p. 202.
Calliethera scenica C. Koch. Uebers de Arachn. Syst., 1, p. 31.
Calliethera histrionica. *Id.*, *ibid.*
Calliethera histrionica. *Id.* Die Arachn., XIII, p. 42, figs. 1110, 1111.
Calliethera scenica. *Id.*, *ibid.*, p. 37, figs. 1106, 1107.
Calliethera aulica. *Id.*, *ibid.*, p. 51, figs. 1118, 1119.
Salticus propinquus Lucas. Expl. Alg. Ar., p. 162.
Salticus albovittatus. *Id.*, *ibid.*, p. 164.
Epiblemum faustum Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 367.
Calliethera histrionica Thorell. Rec. crit. Aran., p. 68.
Calliethera scenica. *Id.*, *ibid.*
Salticus scenicus Blackw. Spid. of Gr. Brit., 1, p. 47.
Callietherus histrionicus Simon. Monogr. d'Att. d'Eur., p. 650.
Epiblemum histrionicum Thorell. On Europ. Spid., p. 211.
Epiblemum scenicum Thorell. On Syn., p. 360.
Calliethera scenica Simon. Arachn. de France, III, p. 64.
Epiblemum scenicum Workman. Irish Spid. Belf. Nat. Hist. Soc., p. 16.

ADMESTINA.

Peckham. Att. of N. A. Wis. Ac., etc., 1888, p. 78.

A. wheelerii Peckham. Att. of N. A. Wis. Ac. Sc., etc., 1885, p. 78, pls. 1, 5, fig. 58. Wis.

HYCTIA.

Simon. Arachn. de France, III, p. 18. 1876.

H. pikei Peckham. Att. of N. A. Wis. Ac. Sc., etc., p. 70, pls. 1, 4, 5, fig. 59. N. Y., S. C., Ga., Fla., D. C.

MARPTUSA.

Thorell. Ragni Malesi e Pap., 1, p. 221. 1877.

1846. *Marpissa* C. Koch. Die Arachn., XIII, p. 56 *ad part.*
1850. *Marpissa id.* Uebers d. Arachn., Syst., V, p. 47.
1868. *Marpissus* Simon. Monogr. d'Attid., pp. 6, 7 *ad part.*
1869. *Marpessa* Thorell. On Europ. Spid., p. 213 *ad part.*
1876. *Marpissa* Simon. Arachn. de France, III, p. 23.
1879. *Marptusa* L. Koch. Arachn. Austral., p. 1092 *ad part.*
1885. *Marptusa* Peckham. Genera of the Fam. Att. Wis. Acad. Sc., etc., p. 291.

M. californica Peckham. Att. of N. A., p. 81, pls. 1, 5, 6, fig. 61. Cal.
M. conspersa C. Koch = *familiaris.*
M. familiaris Hentz (*Attus*). Journ. Bost. Soc. Nat. Hist., V, p. 354. *Id.,* Spid. U. S., ed Burgess, p. 56, pl. 8, fig. 7. U. S.
——— Peckham. Att. of N. A., p. 80, pls. 1, 4, 5, fig. 60.
  Marpissa undata C. Koch. Die Arachn., XIII, p. 60, fig. 1127.
  Marpissa conspersa. *Id., ibid.,* p. 61, fig. 1128.
  Marpissa varia. *Id., ibid.* p. 69, fig. 1135.
M. undata C. Koch = *familiaris.*
M. varia C. Koch = *familiaris.*

MENEMERUS.

Simon. Monogr. d'Att. de l'Europ. p. 6. 1869.

Peckham. Genera of the Fam. Att. Wis. Ac. Sc., etc., 1885, p. 292.

M. cruciferus Keyserling. N. Spinn. a. Am., VI. Verh. d. z. b. Ges. Wien, 1884, p. 513, pl. 13, fig. 18. S. C.
M. melanognathus Lucas. (*Salticus*) Hist. Nat. d'Iles Canar., II, p. 29, pl. 7, fig. 4, 1839. Fla.
——— Peckham. Att. of N. A., p. 82, pls. 1, 6, fig. 62.
  Marpissa dissimilis C. Koch. Die Arachn., XIII, p. 70, figs. 1135, 1136.
  Marpissa incerta. *Id., ibid.,* p. 73, fig. 1138.
  Salticus convergens Doleschall. Tw. Bijdr. Ar. Ind. Archip., p. 15, pl. 9, fig. 4.
  Attus muscivorus Vinson. Ar. d. Iles d.l. Reunion, p. 47, pl. 10, fig. 1.
  Attus foliatus L. Koch. Verh. d. z. b. Ges. Wien, 1867, p. 226.
  Salticus nigro-limbatus Cambridge. Proc. Lond. Zool. Soc., 1869, p. 542, pl. 42, fig. 10.
  Marpissa nigro-limbata. *Id.,* Syst. list of Spid. of Gr. Brit. and Irel. *Ibid.,* XXX, p. 333.

Icius (?) *convergens* Thorell. Studi, etc., II. Ragni de Amboina, pp. 232, 309.
Marptusa marita Karsch. West Afr. Ar. in Zeitschr. f. ges. Naturwiss., LII, p. 338.
Menemerus foliata L. Koch. Arachn. Austral., p. 1123, pl. 98, figs. 1, 2.
Attus mannii Peckham. Descr. of Att. of U. S., p. 27, pl. 3, fig. 21.
Menemerus melanognathus E. Simon. Arachn. de l' Ocean Atl. Ann. Soc. Ent. Fr. 1883, pp. 284, 306.

M. paykullii Aud. et Sav. (*Attus*). Descr. de. l' Egypt, XXII, p. 172, 1825-27. Fla.
—— Peckham. Att. of N. A., p. 84, pls. 1, 6, fig. 63.
Attus paykullii Walck. Ins. Apt., I, p. 426.
Attus ligo Walck. *Ibid.* p. 426.
Attus binus Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 352. *Id.*, Spid. U. S., ed. Burgess, p. 51, pl. 8, fig. 2
Plexippus ligo C. Koch. Die Arachn., XIII, p. 107, fig. 1168, 1169.
Salticus vaillantii Lucas. Expl. de l' Algeria. Zool. I, p. 136.
Attus africanus Vinson. Ar. d' Iles d.l. Reunion, etc., p. 52.
Euophrys delibuta L. Koch. Verh. d. z. b. Ges. Wien, 1865, p. 874.
Hasarius Paykullii Simon. Arachn. d. France, III, p. 81.
Menemerus Paykullii Thorell. Studi sui Ragni Malesi, etc., III, p. 501.
Menemerus Paykullii Koch in Keyserling Die Arachn. Aust., p. 1461.

HOMALATTUS.

White. Descr. of Arachn. Ann. and Mag. Nat. Hist., VIII, p. 476. 1841.

1848. *Rhanis.* C. Koch. Die Arachn., XIV, p. 86.
1869. *Rhene.* Thorell. On Europ. Spid.
1877. *Homalattus* Thorell. Ragni Malesi, etc., I, p. 289.
1879. *Homalattus* L. Koch. Die Arachn., Austral., p. 1083.
1880. *Homalattus* Karsch. Zeitschr. f. ges. Naturwiss., LIII, p. 396.
1885. *Homalattus* Peckham. Genera Fam. Att., Wis., Ac. Sc., p. 281.
1888. Peckham. Att. of N. A., p. 85.

H. cyaneus Hentz (*Attus*). Journ. Bost. Soc. Nat. Hist., V, p. 365. *Id.*, Spid. U. S., ed. Burgess, p. 69, pl. 9, fig. 13. Ala., Ga., Nebr.
—— Peckham. Att. of N. A., p. 86, pl. 1, fig. 64.
H. septentrionalis Keyserling. N. Spinn. a. Am., VI. Ver. d. z. b. Ges. Wien, 1884, p. 515, pl. 13, fig. 19. Mass.

BALLUS.

C. Koch. Uebers d. Arachn. Syst., V, p. 68. 1850.

1869. Thorell. On Europ. Spid., p. 212.
1885. Peckham. Genera Fam. Att. Wis. Ac., p. 286.

B. youngii Peckham. Att. of N. A., p. 87, pl. 1, fig. 66. Pa.

NEON.

Simon. Arachn. d. France, III, p. 208. 1876.

1885. Peckham. Genera Att. Wis. Ac. Sc., etc., p. 282.

N. nellii Peckham. Att. of N. A., p. 88, pls. 1, 6, fig. 65. Pa., Canada.

ZYGOBALLUS.

Peckham. Proc. Nat. Hist. Soc. Wis., p. 81. 1885.

Id., Att. of N. A., 1888.

Z. **bettina** Peckham. Att. of N. A., p. 89, pls. 1, 6, fig. 68. Wis., Mo, Ga., Fla.
Z. **sexpunctatus** Hentz (*Attus*). Journ. Bost. Soc. Nat. Hist., v, p. 202. *Id.*, Spid. U. S., ed. Burgess, p. 54, pl. 7, fig. 14. N. C., Ga., Fla.
——— Peckham. Att. of N. A., p. 89, pls. 1, 6, fig. 67.

AGOBARDUS.

Keyserling. N. Spinn. a. Am. Verh. d. z. b. Ges. Wien, p. 519. 1884.

1885. Peckham. Genera Att. Wis. Ac. Sc., etc., p. 338.

A. **anormalis** Keyserling. N. Spinn. a. Am., VI. Verh. d. z. b. Ges. Wien, 1884, p. 519, pl. 13, fig. 21. U. S.
——— Peckham. Att. of N. A., p. 90, pls. 1, 6, fig. 74.

ZENODORUS.

Peckham. Genera Att. Wis. Ac. Sc., etc., p. 297. 1885.

Ephippus Thorell. Studi sui Ragni Malesi, III, p. 643.

Z. **americanus** Keyserling (*Ephippus*) N. Spinn. a. Am., VI. Verh. d. z. b. Ges. Wien, 1884, p. 506, pl. 13, fig. 13. Utah.

ERGANE.

Keyserling. Die Arachn. Austral., p. 1260. 1881.

1885. Peckham. Genera Att. Wis. Ac. Sc, etc., p. 315.

E. **tæniata** Keyserling. N. Spinn. a. Am., VI. Verh. d. z. b. Ges. Wien, 1884, p. 507, pl. 13, fig. 14. N. A.

PELLENES.

Simon. Arachn. d. France, III, p. 90. 1876.

1885. Peckham. Gen. Att. Wis. Ac. Sc., etc., p. 314.

P. nigriceps Keyserling =*Habrocestum splendens.*

ATTUS.

Walck. Tab. 1, d. Arachn., p. 22 *ad part.* 1805.
Attus Peckham. Gen. of Fam. Att., Wis. Ac. Sc., 1885, p. 322.
Attus Hentz. Journ. Bost. Soc. Nat. Hist., v, p. 198 *ad part.*
Attus Hentz. Spid. U. S., ed Burgess, pp. 11, 49 *ad part.*

A. aestivalis Peckham = *Dendryphantes capitatus.*
A. agrestis Peckham = *Plexippus puerperus.*
A. alboimaculatus Peckham = *Dendryphantes alboimmaculatus.*
A. **ambesas** Walck. Abbot Ga. Spid. Ins. Apt., I, p. 452. Ga.
A. **ambiguus** Walck. *Ibid.*, p. 468. Ga.

A. arizonensis Peckham = *Phidippus arizonensis*.
A. aspergatus Walck. Abbot Ga. Spid. Inst. Apt., I, p. 467. Ga.
A. attentus Walck. *Ibid.*, p. 437. Ga.
A. audax Hentz = *Phidippus morsitans*.
A. auratus Hentz = *Harbrocestum auratum*.
A. auridens Bosc. = *contemplator* Walck.
A. binus Hentz = *Menemerus Paykulli*.
A. brendellii Giebel. Spinn. a Illinois. Zeitschr. f. Ges. Naturwiss., XXXIII, p. 249. Ill.
A. cancroides Walck. = Abbot Ga. Spid. Ins. Apt., I, p. 447. Ga.
A. canonicus Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 365. *Id.*, Spid. U. S., ed. Burgess, p. 70, pl. 9, fig. 14. Ala.
A. canosus Walck. Abbot Ga. Spid. Ins. Apt., I, p. 451. Ga.
A. capitatus Hentz = *Dendryphantes capitatus*.
A. cardinalis Hentz = *Phidippus cardinalis*.
A. castaneus Hentz = *Phidippus rufus*.
A. cautus Peckham. Att. of N. A., p. 93. Mexico.
A. ceruleus Walck. Abbot Ga. Spid. Ins. Apt., I, p. 448. Ga.
A. chrysis Walck. = *Philæus chrysis*.
A. cinereus Walck. Abbot Ga. Spid. Ins. Apt., I, p. 440. Ga.
A. clandistinus Walck. *Ibid.*, p. 440. Ga.
A. clavatus Walck. *Ibid.*, p. 435. Ga.
A. coecatus Hentz = *Habrocestum coecatum*.
A. contemplator Walck. Abbot Ga. Spid. Ins. Apt., I, p. 457. Ga., Ill.
auridens Bosc. Mss. in Walck. *Ibid.*
auridens Giebel. Spinn. a. Illinois. Zeitschr. f. Ges. Naturwiss., XXXIII, p. 248.
A. coronatus Hentz = *Habrocestum coronatum*.
A. cristatus Hentz = *Habrocestum cristatum*.
A. cuntator Walck. Abbot Ga. Spid. Ins. Apt., I, p. 433. Ga.
A. cyaneus Hentz = *Homalattus cyaneus*.
A. dissimilator Walck. Abbot Ga. Spid. Ins. Apt., I, p. 453. Ga.
A. divisus Walck. *Ibid.*, p. 443. Ga.
A. elegans Hentz = *Dendryphantes elegans*.
A. excubitor Walck. Abbot Ga. Spid. Ins. Apt., I, p. 436. Ga.
A. explorator Walck. *Ibid.*, p. 451. Ga.
A. falcarius Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 352. *Id.*, Spid. U. S., ed. Burgess, p. 54, pl. 8, fig. 1. Ala.
A. familiaris Hentz = *Marptusa familiaris*.
A. fasciolatus Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 356. *Id.*, Spid. U. S., ed. Burgess, p. 60, pl. 8, fig. 11. S. C., Mass.
A. flavus Peckham. Descr. of Att. of U. S., p. 9, pl. I, fig. 6. Pa.
A. formosus Peckham = *Philæus rimator*.
A. fraudulentus Walck. Abbot Ga. Spid. Ins. Apt., I, p. 442. Ga.
A. furtivus Walck. *Ibid.*, p. 453. Ga.
A. galathea Walck. = *Phidippus galathea*.
A. gerbellus Walck. *Ibid.*, p. 435. Ga.
A. gracilis Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 359. *Id.*, Spid. U. S., ed. Burgess, p. 63, pl. 8, fig. 20. Ala.
A. hebes Hentz. *Ibid.*, p. 358. *Id.*, *ibid.*, p. 62, pl. 8, fig. 16. N. C., Mass.
A. hentzii Marx (Note 33). Ala., Mass., Ohio.
leopardus Hentz. Journ. Bost. Soc. Nat. Hist., V, p. 359. *Id.*, Spid. U. S., ed. Burgess, p. 63, pl. 8, fig. 21.
A. hoyi Peckham = *Hasarius hoyi*.
A. ictaricus Walck. Abbot Ga. Spid. Ins. Apt. I, p. 452. Ga.

A. imperialis Peckham. Att. of N. A., p. 44, pl. 3, fig. 31. Cal.
A. inclemens Walck. Abbot Ga. Spid. Ins. Apt., I, p. 465. Ga.
A. infectus Walck. *Ibid.*, p. 468. Ga.
A. inquies Walck. *Ibid.*, p. 438. Ga.
A. insidiosus Walck. *Ibid.*, p. 440. Ga.
A. johnsonii Peckham = *Phidippus johnsonii.*
A. insolens Hentz = *Phidippus insolens.*
A. investigator Walck. Abbot Ga. Spid. Ins. Apt., I, p. 441. Ga.
A. iris Walck = *Philæus chrysis.*
A. irroratus Walck. Abbot Ga. Spid. Ins. Apt., I, p. 466. Ga.
A. lentus Walck. *Ibid.*, p. 466. Ga.
A. leopardus Walck. *Ibid.*, p. 457. Ga.
A. leopardus (Note 34) Hentz = *Hentzii* Marx.
A. locustoides Walck. Bosc. Ins. Apt., I, p. 434.
A. magus Walck. *Ibid.*, p. 453. Ga.
A. mannii Peckham = *Menemerus melanognathus.*
A. marginatus Walck. Abbot Ga. Spid. Ins. Apt., I, p. 466. Ga.
A. McCookii Peckham = *Phidippus McCookii.*
A. milbertii Walck. Abbot Ga. Spid. Ins. Apt., I, p. 433. Ga.
A. militaris Hentz = *Philæus militaris.*
A. miniatus Peckham = *Phidippus miniatus.*
A. mitratus Hentz = *Jocus mitratus.*
A. morigerus Hentz = *Icius mitratus.*
A. morsitans Walck = *Phidippus morsitans.*
A. multicolor Hentz = *Dendryphantes multicolor.*
A. mutlivagus Walck. Abbot Ga. Spid. Ins. Apt., I, p. 438. Ga.
A. multivagus (Note 35) Hentz = *vagabundus* Marx.
A. mystaceus Hentz = *Phidippus galathea.*
A. niger Hentz = *Astia vittata.*
A. nubilus Hentz. Journ. Bost. Soc. Nat. Hist., v, p. 358. *Id.*, Spid. U. S., ed. Burgess, p. 61, pl. 8, fig. 15. Ala.
A. nuttallii Hentz. *Ibid.*, p. 352. *Id.*, *ibid.*, p. 65, pl. 8, fig. 4. Mass., D. C., Va.
A. octavus Hentz = *Eris octavus.*
A. octopunctatus Peckham = *Phidippus octopunctatus.*
A. opifex McCook = *Phidippus opifex.*
A. oppositus Walck. Bosc. Ins. Apt., I, p. 435. Carolina.
A. otiosus Hentz = *Phidippus otiosus.*
A. palustris Peckham. Descr. of Att. of U. S., p. 25. *Id.*, Att. of N. A., p. 43, pls. 1, 3, fig. 30. Wis., Mich.
A. parvus Hentz = *Dendryphantes capitatus.*
A. peregrinus Walck. Abbot Ga. Spid. Ins. Apt., I, p. 445. Ga.
A. peregrinus Peckham = *Habrocestum peregrinum.*
A. petulans Marx (Note 36).
protervus Walck. Ins. Apt., I, p. 465. Ga.
A. pileatus Walck. Abbot Ga. Spid. Ins. Apt., I, p. 450. Ga.
A. pilosus Walck. *Ibid.*, p. 447. Ga.
A. pinus Peckham = *Hasarius Hoyi.*
A. pistaceus Walck. Abbot Ga. Spid. Ins. Apt., I, p. 468. Ga.
A. plumosus Walck. Abbot Ga. Spid. Ins. Apt., I, p. 455. Ga.
A. princeps Peckham = *Philæus princeps.*
A. podagrosus Hentz = *Phidippus insolens.*
A. protervus Walck. Abbot Ga. Spid. Ins. Apt., I, p. 443. Ga.
A. protervus (Note 36) Walck = *petulans Marx.*
A. provocator Walck. *Ibid.*, p. 465. Ga.
A. puerperus Hentz = *Plexippus puerperus.*

A. pulcher Walck. Abbot Ga. Spid. Ins. Apt., I, p. 439. Ga.
A. pulex Hentz. *Saitis pulex.*
A. purpurarius Walck. Abbot Ga. Spid. Ins. Apt., I, p. 446. Ga.
A. putnami Peckh. = *Plexippus putnami.*
A. quadrilineatus Peckham = *Icius lineatus.*
A. quaternus Walck. Abbot Ga. Spid. Ins. Apt., I, p. 452. Ga.
A. quinquetesseratus Walck. *Ibid*, p. 448. Ga.
A. rarus Hentz. Journ. Bost. Soc. Nat. Hist., v, p. 358. *Id.*, Spid. U.S., ed. Burgess, p. 62, pl. 8, fig. 18. N. C.
A. retiarius Hentz. *Ibid.*, VI, p. 288. *Id.*, *ibid.*, p. 161, pl. 17, fig. 11. Ala.
A. rimator Walck = *Philæus rimator.*
A. roseus Hentz. Journ. Bost. Soc. Nat. Hist., v, p. 362. *Id.*, Spid., U. S., ed. Burgess, p. 66, pl. 9, fig. 4. Mass.
A. rufus Hentz = *Phidippus rufus.*
A. rupicola Hentz. *Ibid.*, v, p. 357. *Id.*, *ibid.*, p. 61, pl. 8, fig. 14. Ala.
A. rusticolus Peckham. Descr. of Att. of U. S., p. 10, pl. 1, fig. 7. Wis.
A. sagax Walck. Abbot Ga. Spid. Ins. Apt., I, p. 449. Ga.
A. scinicoides Walck. *Ibid.*, p. 440. Ga.
A. scrutator Walck. *Ibid.*, p. 444. Ga.
A. sexpunctatus Hentz = *Zygoballus sexpunctatus.*
A. signatus Walck. Ins. Apt., I, p. 434. U. S.
A. sinister Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 288. *Id.*, Spid. U.S., ed. Burgess, p. 161, pl. 17, fig. 12. Ala.
A. smaragdinus Walck. Abbot Ga. Spid. Ins. Apt., I, p. 448. Ga.
A. speculator Walck. *Ibid.*, p. 456. Ga.
A. splendens Peckham. Descr. of Att. of U. S., p. 4, pl. 1, fig. 3. Wis.
A. subflavus Walck. Abbot Ga. Spid. Ins. Apt., I, p. 447. Ga.
A. superciliosus Hentz = *Dendryphantes elegans.*
A. sylvanus Hentz. Journ. Bost. Soc. Nat. Hist., v, p. 364. *Id.*, Spid. U. S., ed. Burgess, p. 68, pl. 9, fig. 10. S. C.
A. tæniola Hentz = *Cyrba tæniola.*
A. tibialis Peckham = *Dendryphantes elegans.*
A. tridentiger Walck. Abbot Ga. Spid. Ins. Apt., I, p. 449. Ga.
A. tripunctatus Hentz = *Phidippus morsitans.*
A. undatus Walck. Ins. Apt. I, p. 463. Pa.
A. vagabundus (Note 35) Marx. Ala.
Attus mullivagus Hentz. Journ. Bost. Soc. Nat. Hist., v, p. 363. *Id.*, Spid. U. S., ed. Burgess, p. 67, pl. 9, fig. 7.
A. viridipes Hentz = *Habrocestum viridipes.*
A. viridis Walck = *Lyssomanes viridis.*
A. vittatus Hentz = *Astia vittata.*

WALA.

Keyserling. N. Spinn. a. Am., VI. Verh. d. z. b. Ges. Wien., p. 516. 1884.

1885. Peckham. Genera Fam. Att. Wis. Acad., p. 339.

W. albovittata Keyserling (Note 37). N. Spinn. a. Am., VI. Verh. d. z. b. Ges. Wien. 1884, p. 517, pl. 13, fig. 20. N. A.

SYNEMOSYNA.

Hentz. Am. Journ. Sciences and Arts, XXI, p. 108. 1832.

Hentz. Journ. Bost. Soc. Nat. Hist., v, p. 367. *Id.*, Spid. U. S., ed. Burgess, p. 72.

1879. L. Koch. Die Arachn. Austral., p. 1052.
1880. Karsch. Z. Kenntn. d. Att. Zeitschr. f. Ges. Naturw., LIII, p. 395.

1885. Peckham. Gen. Att. Wis. Ac. Sc., etc., p. 278.
1888. Peckham. Att. of N. A., p. 93.

S. ephippiata Hentz = *Salticus ephippiatus.*
S. formica Hentz. Journ. Bost. Soc. Nat. Hist., v, p, 368. *Id.*, Spid. U. S., ed. Burgess, p. 73, pl. 9, fig. 18. Ala., S. C., Va.
Janus gibberosus C. Koch. Die Arachn., XIII, p. 21, fig. 1091.
S. noxiosa Hentz. Journ. Bost. Soc. Nat. Hist., VI, p. 288. *Id.*, Spid. U. S., ed. Burgess, p. 161, pl. 17, fig. 10. Ala.
S. picata Hentz = *Synageles picata.*
S. scorpiona Hentz = *Synageles scorpiona.*

SYNAGELES.

Simon. Arachn. d. France, III, p. 14. 1876.

1885. Peckham. Gen. Att. Wis. Ac. Sc., etc., p. 275.

S. picata Hentz (*Synemosyna*). Journ. Bost. Soc. Nat. Hist., v. p. 370. *Id.*, Spid. U. S., ed. Burgess, p. 75, pl. 9, fig. 21.
——— Peckham. Att. of N. A., p. 94, pl. 6, fig. 71.
S. scorpiona Hentz (*Synemosyna*). Journ. Bost. Soc. Nat. Hist., v, p. 369. *Id.*, Spid. U. S., ed. Burgess, p. 74, pl. 9, fig. 19.
——— Peckham. Att. of N. A., p. 95, pl. 6, fig. 72.

SALTICUS.

Latreille. Nouv. Dict. d'Hist. Nat., XXIV, p. 135. 1804.

1846. *Toxeus* C. Koch. Die Arachn., XIII, p. 19.
1869. *Pyroderus* Simon. Monogr. d'Att., p. 248.
1880. *Toxeus* Karsch. Z. Kenntn. d. Attidæ. Zeitschr. f. ges. Naturwiss., LIII, pp. 393, 394.
1885. *Salticus* Peckham. Genera Att. Wis. Ac. Sc., etc., p. 274.

S. albocinctus C. Koch = *ephippiatus.*
S. ephippiatus Hentz (*Synemosyna*). Journ. Bost. Soc. Nat. Hist., v, p. 369. *Id.*, Spid. U. S., ed. Burgess, p. 74, pl. 9, fig. 20. Pa., N. Y., Ala.
albocinctus C. Koch. Die Arachn., XIII, p. 36, fig. 1105.
S. borealis Blackw. Spid. fr. Canada. Ann. Mag. of Nat. Hist., XVII, p. 35.
S. decorus Blackw. *Ibid.*, p. 34.
S. fuligineus Blackw. *Ibid.*, p. 36.
S. sundevallii Blackw. *Ibid.*, p. 37.
S. scenicus (Latr.) = *Epeblimum scenicum.*

MYRMECIA Walck.

M. caliginosa Walck. Abbot Ga. Spid. Ins. Apt., I, p. 388. Ga.
M. lunata Walck. *Ibid.*, p. 387. Ga.
M. nigra Walck. *Ibid.*, p. 386. Ga.
M. rubra Walck. *Ibid.*, p. 387.

JANUS C. Koch.

J. gibberosus C. Koch = *Synemosyna formica.*

Subfamily LYSSOMANINÆ.

LYSSOMANES.

Hentz. Journ. Bost. Soc. Nat. Hist., v, p. 198. 1845.

1875. Hentz. Spid. U. S., ed. Burgess, p. 48.
1885. Peckham. Genera Att. Wis. Ac. Sc., etc., p. 333.
1888. Peckham. Att. of N. A., p. 97.
1888. Peckam and Wheeler. Spid. subfamily *Lyssomanæ.* Wis. Ac. Sc., etc., p. 225.

L. viridis Walck. (*Attus*). Abbot Ga. Spid. Ins. Apt., I, p. 469. Ga., Ala., Miss., Fla.

——— Hentz. Journ. Bost. Soc. Nat. Hist., v, p. 198. *Id.*, Spid. U. S., ed. Burgess, p. 49, pl. 17, fig. 3.

——— Peckham. Spid. subfamily *Lyssomanæ.* Wis. Ac. Sc., etc., p. 228, pl. 11, fig. 3, pl. 12, fig. 6.

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ADMESTINA Peckham, Attidæ of North America, p. 78, 1888, *Attidæ*	575
AGALENA Walckenaer, Tableau des Aran., p. 51, 1805, *Agalenidæ*	515
AGOBARDUS Keyserling, N. Sp. a. Am., VI, Verh. d. z.-b. Ges. Wien, p. 519, 1884, *Attidæ*	577
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ALPHABETICAL LIST OF SYNONYMS OF GENERA.

Arctosa C. Koch=Trochosa.
Argus Walck.=Dictyna.
Avicularia Thorell=Eurypelma.
Bathyphantes Menge=Linyphia.
Bolyphantes Menge=Linyphia.
Caliethera C. Koch=Epiblemum.
Callilopis Westr.=Pythonissa.
Castianeira Keyserling=Corinna.
Ceratina Menge=Erigone.
Ceratinella Emerton=Erigone.
Ceratinopsis Emerton=Erigone.
Cerceis Menge=Cercidia.
Ciniflo Blackw.=Amaurobius.
Conopistha Karsch=Argyrodes.
Cornicularia Menge=Erigone.
Cratoscelis Lucas=Pachyloscelis.
Ctenium Menge=Pedanostethus.
Ctenophora Blackw.=Mimetus.
Cyllopoda Hentz=Hyptiotes.
Cyrtogaster Keyserl.=Cyrtarachne.
Cyrtonota Simon=Epiblemum.
Dicymbium Menge=Erigone.
Decyphus Menge=Erigone.
Dinognatha White=Tetragnatha.
Diognatha White=Tetragnatha.
Diplostyla Emerton=Linyphia.
Drapetisca Menge=Linyphia.
Ebæa L. Koch=Gea.
Elaphidium Menge=Erigone.
Ephippus Thorell=Zenodorus.
Ergatis Blackw.=Dictyna.
Eucharia C. Koch=Steatoda.
Geotrecha Emerton=Thargalia.
Gonatium Menge=Erigone.
Gongylidium Menge=Erigone.
Grammonota Emerton = Erigone.
Helophora Menge=Linyphia.
Janus C. Koch=Synemosyna.
Lasaeola Simon=Dipœna.
Leptothrix Menge=Erigone.
Leptyphantes Menge=Linyphia.
Lophocarenum Menge=Erigone.
Lophomma Menge=Erigone.
Madognatha Simon=Cteniza.
Marpessa Thorell=Marptusa.
Marpissa Thorell=Marptusa.
Marpissus Simon=Marptusa.
Melanophora C. Koch=Prosthesima.
Metastenus Bertkau=Tibellus.
Micrathena Sund.=Acrosoma.
Micrœpeira Emerton=Theridiosoma.
Microneta Menge=Erigone.
Micryphantes C. K.=Euryopis and Erigone.
Miltia Simon=Prodidomus.
Mithras C. Koch=Hyptiotes.
Nemesia Thorell=Cteniza.
Nerienne Blackw.=Erigone.
Ocypete C. Koch=Heteropoda.
Oletera Walck.=Atypus.
Omosita Simon=Loxosceles.
Omosites Walck.=Loxosceles.
Oophora Hentz=Spermophora.
Operaria Blackw.=Dictyna.
Oroodes Simon=Ulesanis.
Pachydactylus Menge=Dipœna.
Pasithea C. Koch=Peucetia.
Pedina Menge=Linyphia.
Phalops Menge=Erigone.
Phillyra Hentz=Uloborus.
Philoica C. Koch=Tegenaria.
Platyopis Menge=Erigone.
Plectana Walck.=Gasteracantha and Acrosoma.
Potamia C. Koch=Pirata.
Pylarus Hentz=Ariadne.
Pyroderes Simon=Salticus.
Rhanis C. Koch=Homalattus.
Rhene Thorell=Homalattus.
Romphæa L. Koch=Ariamnes.
Sarotes Sundev.=Heteropoda.
Savignia Blackw.=Erigone.
Sphasus Walck.=Oxyopes.
Spiropalpus Emerton=Erigone.
Stegosoma Cambr.=Ulesanis.
Stemonyphantes Emerton=Linyphia.
Stylophora Menge=Linyphia.
Sudabe Karsch=Ulesanis.
Teratodes C. Koch=Filistata.
Thorellia L. Koch=Saitis.
Tmeticus Menge=Erigone.
Toxeus C. Koch=Salticus.
Veleda Blackw.=Uloborus.
Walckenaera Blackw.=Erigone.

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NOTES.

1. *Pachylomerus solstitialis.*—The only reason I have to infer that *solstitialis* is the male of *carolinensis* is the fact that *carolinensis* is described as a female, *solstitialis* as a male—both from the same locality; that the opposite sexes of these two species have not been found and there is nothing in their structural characters to oppose this view.

2. The old Walckenarian generic denomination *Mygale*, which comprised all those spiders which are now considered as *Territelariæ*, has generally been abandoned and its species have been distributed in their proper genera.

The species of our country, described under this name by various older authors, have all been assigned their places in modern classification but two: *fluviatilis*, Hentz, and *notasiana*, Walck., which have not been observed again. I have to leave these, therefore, under *Mygale*.

3. Hentz united indiscriminately in his genus *Herpyllus* all the *Drassidæ* (*sensu strictu*) and some genera of other families. I was not able to determine all his species and place them in their proper genera, but had to leave four species provisionly under the old name *Herpyllus*.

4. I can not understand why Mr. Emerton has resurrected the family *Ciniflonidæ*, Blackw. Blackwall has based this family upon only one characteristic point, the presence of the Cribellum and Calamistrum, a feature which occured in the most widely separated and heterogeneous forms. This family was, therefore, never recognized by any other arachnologists.

5. *Thalamia.*—This spider I have not seen myself nor read any description of or remarks about it except the little that Hentz had to say. But in my endeavor to recognize Hentz's spiders, I have been convinced that *Thalamia* belongs to the family *Uroteidœ* rather than to any other family; the arrangement of the eyes, the long spinnerets, and the shape of the cephalothorax will justify such opinion.

The structural characters of this spider, however, are such as to separate it from the existing European genera, and I, therefore, let it stand provisionly as a new genus in the family.

6. *Clubionidæ.*—With the same right and for the same reason that the family *Agalenidæ*, Thorell *et al.*, has lately been divided into *Dictynidæ* and *Agalenidæ*, the family *Drassidæ* ought to be split. It has been acknowledged long ago that this family contained very heterogeneous elements, which had, however, concentrated themselves into two natural groups, one containing such forms as have the inferior spinnerets separated from each other, the maxillæ impressed transversely, and which live generally on the ground, under moss and stones, and are more nocturnal in their habits, while the members of the other groups live generally on plants and trees, their habits are decidedly diurnal, the spinnerets are here contiguous, and the impressions on the maxillæ are wanting. Simon recognized the value of these characters by giving to each the rank of a subfamily. I go a step further and raise the subfamily to a family.

7. *Corinna.*—C. Koch, in describing (Die Arachniden, IX, p. 18, 1842) the first species of the five in his genus *Corinna* remarks that the species of this genus can be divided into two natural groups; the first has the anterior middle eyes the largest, and the four middle eyes stand in a square; the second group contains those in which the anterior middle eyes are not larger than the others, and the four middle eyes stand in a trapez, narrower in front. To the first group belong *rubripes* and *nigricans*, and to the second *memnonia*, *cinculata*, *amœna*, and *tricolor*, species from the United States. Should we form from these two groups separate genera, the generic name *Corinna* would have to be retained for the first group, as it contains the species first described, and this, of course, is the type of the genus if not otherwise stated. *Corinna*, then, has the anterior middle eyes largest.

Keyserling published (Verhandl. d. zool.-botan. Gesellsch. Wien, 1879, p. 335) a new genus, *Castianeira*, closely related to *Corinna*, and its characteristics are exactly those of *Corinna* in the new definition; that is, the anterior middle eyes are the largest.

Karsch (Zeitschrift für ges. Naturwiss., LIII, p. 373) divides the genus *Corinna* K. into the following genera:

1	Abdomen with a horny basal shield	2
	Abdomen without a horny basal shield	3
2	Anterior middle eyes largest, mandibles very strong, I legs longest	*Corinna* Koch
	Anterior middle eyes not largest, mandibles small, directed back, IV legs longest	*Thargalia* Karsch
3	I legs very much the longest	*Mandane* Karsch
	IV legs the longest	4
4	Mandibles and claws extremely long	*Megalostrata* Karsch
	Mandibles and claws of medium size	*Corinnomma* Karsch

This later genus is Thorell's *Corinna severa* (Studi sui Ragni Males et Pap. I. Ann. del mus. civ. de Genova, X, 1877, p. 481).

Keyserling, in describing *Castianeira bivittata* from Massachusetts (Verh. d. z. b. Ges. Wien, 1887, p. 442) asserts that *Thargalia* is synonymous with *Castianeira*.

Now the case stands as follows: Keyserling's first mistake was to form his genus *Castianeira* for *Corinna*, and his second to assert that *Thargalia* is synonymous with *Castianeira*. On the contrary, *Castianeira* is a synonym of *Corinna*, and has to be dropped, and C. Koch's second group is *Thargalia* Karsch. This latter genus contains the most common of the United States species.

Emerton's new genus *Geotrecha* (New Eng. Drass., Agal., and Dysderidæ, Trans. Conn. Ac., VII, p. 4) is nothing more than Karsch's Thargalia, and has to go, therefore, to the same synonyms.

8. *Catadysas* was found by Hentz but once—an undeveloped male—and has since not been found again. We have, therefore, to rely upon the meager description of Hentz. Fortunately, Hentz gave us a good illustration. Thorell formed a new family for this peculiar genus, the *Catadysoidæ*, and assigned it to a place among the *Territelariæ* on account of the vertical movement of the mandibular claws and the insertion of the maxillary pulpi into the tip of the maxillæ. Ausserer in his Beitr. z. k. d. Territel. followed Thorell in this arrangement. As the *Territelariæ* are composed exclusively by *tetrapneumonic* species and form thus a natural group of distinct characters, and as *Catadysas* possesses only two lamellar tracheæ I hold that its proper place is among the *Dipneumones*, and as Holmberg gives his reasons in Bolet. Acad. Argentin., IV, p. 153, that *Catadysasis* a *Drassid*, which seems to me very probable, I have placed this family near the family *Clubionidæ*.

9. The statement of Emerton that *Tegenaria medicinalis* Hentz is a *Cœlotes*, and a synonym of his *Cœlotes medicinalis*, is merely a lapsus calami.

10. *Hamataliva.*—This very interesting spider, of which I only possessed two specimens, both females one of which I presented to Count Keyserling, has been by this author assigned a place in the family *Agalenidæ*. Keyserling himself was in doubt as to the right place for this abnormal species, but thought that this family offered greater affinities than any other. I think, however, that we ought to form a new family for *Hamataliva*, the *Hamatalividæ*. Unfortunately I have only one specimen, and this is not in perfect state. I, therefore, leave it provisionally in its old place.

11. *Prodidomidæ.*—Thorell proposed a new family in 1875 for the genus *Miltia* for the reason that the characters of this genus were not in conformity with the family *Enyoidæ* to which Simon had assigned it. Thorell gave this family the name *Miltioidæ* and placed it between the *Enyoidæ* and

Urocteidæ. In 1884 Simon discovered that his *Miltia* was identical with Hentz's genus *Prodidomus* and that consequently the name *Miltia* had to be dropped for Hentz's name. I, therefore, change the name of the family in accordance with the type genus into *Prodidomidæ*.

12. *mandibulata*.—Keyserling erroneously took *mandibulata* for the male of *pusilla*, while the real male of this species is a different form; therefore *mandibulata* remains a good species, especially as the female has been collected in Tennessee.

13. Although Emerton admits that the eyes of his two species are all of the same size he brings them under a genus which is distinguished by the minute anterior middle eyes. These two species are, therefore, not *Pholcomma* at all, but I have to let them stay here provisionally as I have had no opportunity to study them.

14. *Erigone*.—By following Keyserling in not recognizing Menge's, Emerton's, and Simon's breaking up of the genus *Erigone* into many smaller genera and, therefore, reuniting the species again under the one genus *Erigone*, I was compelled to change the homonymous names of some of Emerton's species as follows: *Cornicularia minuta=Erigone paullula; Lophocarenum pallidum=Erigone pallens; Tmeticus pallidus=Erigone pallescens; Tmeticus montanus=Erigone collina; Tmeticus tibialis=Erigone monticola; Tmeticus brunneus=Erigone fusca.*

15. *Acrosoma gracile*.—In regard to the use of Walckenaer's specific names made for Abbot's illustrations my views correspond with those of Dr. McCook as expressed in the Proceedings of the Academy of Natural Sciences, Philadelphia, pp. 1 and 428, 1888.

16. *Acrosoma aculeatum*.—C. Koch gives the patria of *Acr. aculeatum* and *crassispinum* as "Amerika." The Germans generally understand by "Amerika" North America, and as the two species are closely related to gracile and sagittatum I have included them in this catalogue, but have given them a separate place.

17. *foliata* Hentz.—Walckenaer used the name *foliata* for *Ep. cornuta*; for Hentz's name I proposed *folifera*.

18. *globosa* Keyserling.—Keyserling described this Spider as *globosa* first in 1865. Emerton is wrong in substituting McCook's name *triaranea*, 1876.

19. *maculata* Keyserling.—This Spider, though related, is not identical with *Ep. gibberosa*, as Emerton erroneously asserts.

20. *obesa* Hentz.—This variety seems to me to belong rather to *marmorea* (*insularis*, Hentz) than to *trifolium*, as the coloration of the legs, especially that of femur IV indicates.

21. *septima* Hentz.—Amongst a lot of *Epeira cavatica* Keyserling which I received from Tennessee I found a few specimens which resemble most exactly the description and illustration of Hentz's *septima*. As Hentz records this Spider from North Carolina and Alabama, where *cavatica* is quite common, there is no doubt that it is a variety of *cavatica* and not of *trifolium* as Emerton asserts.

22. *bifurca*, McCook.—This is clearly no *Cyrtophora*. In this genus the lateral eyes are disjoined for a distance nearly equal to their diameter, which is not the case with *bifurca*.

23. *Cyclosa conica*.—The Spider which Emerton described under this name is, according to Keyserling in litt., not *conica* Pallas, but *caudata* Hentz, *turbinata* Walck. I have, however, in my collection the true *conica* Pallas, from San Diego, Cal.

24. *Theridiosoma* Cambr.—Dr. McCook was certainly right to place his *Epeira radiosa* in the family *Epeiridæ*. Not only do the structural characters, the position of the eyes near the *clypeus*, the form of the maxillæ, etc., but the biological fact, first discovered by that naturalist, that this Spider constructs an orb web, of which the spiral threads are viscid, all warrant such placing. As *radiosa* is, however, a Theridiosoma, according to Thorell and Keyserling, we have to drop Emerton's new genus *Microepeira* (a barbaric name by the way) and transfer the genus *Theridiosoma* to the *Orbitelariæ*, fam. *Epeiridæ*.

25. *Tetragnathidæ*.—Keyserling in Die Arachn. Australiens, No. 36, p. 218, has given us a splendid subdivision of the large genus *Tetragnatha* according to the following key:

1 { Space betw. LE not greater than that betw. AME and PME...*Tetragnatha*
  { Space betw. LE greater 2
2 { Spinnerets terminal.......................................*Eugnatha*
  { Abdomen extending beyond spinnerets........................*Eucta*

26. *Thomisus*. This is not the genus *Thomisus* of our modern authorities as Thorell, Keyserling, Simon, etc., but the old Walckenaerean genus, which comprised once nearly all the genera of this family. I have collected all species under this name which have not yet been re-arranged, giving to these the proper synonyms which I could collect in the present literature.

27. *inquisitor* Thorell.—As this name is preoccupied by Walckenaer, I have substituted for it *Thorellii*.

28. *obscurus* Keyserling. This species name is also preoccupied by Blackwall, and had to be changed into *Keyserlingii*.

29. *impavida* Thorell.—As this specific name has been previously used for a *Lycosa* by Walkenaer it has to be changed to *intrepida*.

30. *Lycosa nidifex* Emerton (or rather Marx) is, as Emerton himself states, synonymous with *arenicola* Scudder. Why Emerton has retained my name for Scudder's older one I can not understand.

31. *Tarentula modesta* has been used by Keyserling previous to Thorell, therefore Thorell's *modesta* has to be changed into *pudens*.

32. *Ocyale*.—Looking over the many illustrations of the European species of *Ocyale*, it strikes me that they differ considerably from those of our country in the position of the posterior eye row. While in the European species the four posterior eyes are actually placed in two rows and the distance between them is much larger than the diameter of one of the eyes, the four eyes in the American species are placed in such a position that a line drawn through the superior margin of the posterior middle eyes will run *through* the disc of the post. lateral eyes. The position of the anterior eyes is the same as in those from Europe except that the anterior middle eyes appear a little farther removed toward the front than in the European species.

33. *Dolomedes tenebrosus* Emerton.—It appears to me that Emerton, in describing the male of *Dolomedes tenebrosus* Hentz, had under observation the male of *sexpunctatus;* for the specimens of this species in my own collection and in that of Dr. W. H. Fox of this city correspond in every detail with Emerton's description of his *tenebrosus*. Further I hold that Emerton's *D. fontanus* is the real male of *tenebrosus* because our ♂ *tenebrosus* has all the characters of Emerton's *fontanus*. Now the male of what I consider *sexpunctatus*—tenebrosus Em.—has the markings of the female *sexpunctatus* in a more or less distinct degree; moreover, both sexes have been caught together. On the other hand *our ♂ tenebrosus*=(*fontanus Em.*) is found quite frequently with the female, while the female of Emerton's *fontanus* is yet unknown.

34. *leopardus* Hentz.—As this name is preoccupied by Walkenaer I propose the name *Hentzii* for it.

35. *protervus* Walk.—Walkenaer has used this specific name twice. For that described last I substitute the name *petulans*.

36. *multivagus* Hentz.—This is also preoccupied by Walkenaer; I substitute, therefore, *vagabandus*

37. *Wala* Keyserling.—Mr. Peckham has made a mistake in asserting that *Wala albovittata* Keyserling is synonymous with *Icius albovittatus*. This author described both, and the descriptions differ so widely that it must have been an oversight of Peckham.

NOTES ON THE SERPENTINOUS ROCKS OF ESSEX COUNTY, NEW YORK; FROM AQUEDUCT SHAFT 26, NEW YORK CITY; AND FROM NEAR EASTON, PENNSYLVANIA.

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A.—ESSEX COUNTY, NEW YORK.

That the Serpentine of the ophiolite of Thurman, Warren County, New York, was a secondary product after a lime magnesian pyroxene has been stated by the author in a previous paper.* Since that paper was written he has, through the kindness of Prof. J. C. Smock of the State Museum at Albany, had an opportunity for examining similar material from Bolton and Warrensburgh, in Warren County, and from Amity, in Orange County. In all of these the serpentine is plainly of like origin.† It was also stated in the paper mentioned that a part at least of the Essex County serpentine was of like metasomatic origin, but that a considerable portion was apparently after a mineral the exact nature of which had not been determined. Further investigation has not completely solved the problem, but as the matter must be dropped here for the present it is deemed best to put on record such results as have thus far been obtained. As is well known the Essex County ophiolite is the primary limestone of Emmons, and which it will be remembered he considered to be of plutonic origin.‡

Concerning the composition of the rock this writer says:

> This range of limestone is distinguished throughout, so far as I am acquainted with it, for its compound character, being combined or mixed in several proportions with serpentine. In some parts of the rock the limestone and serpentine are in about equal proportions; in other instances the limestone predominates, the serpentine gradually disappearing, till only here and there a small portion is discernable, when

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* On the Ophiolite of Thurman, Warren County, New York, with remarks on the Eozoon Canadense. By George P. Merrill, Am. Jour. Sci., XXXVII, March, 1889, p. 189.

† On account of the known occurrence of chondrodite in the limestone of Orange County it was thought that a portion at least of the serpentine of this locality might result from alteration of this mineral. None of the sections at hand show this to be the case. The altering mineral is in all cases colorless, non-pleochroic, with well developed prismatic cleavage, and is insoluble in acids. Chondrodite, on the other hand, is pleochroic in yellowish colors and shows only very imperfect cleavages, besides gelatinizing when treated with hydrochloric acid.

‡ Nat. Hist. of New York: Part IV, Geology, p. 228.

> the limestone becomes a nearly pure rock, or free from intermixture with this substance. Whenever these two substances are commingled in the same mass, it is more free from siliceous minerals either in the form of quartz, pyroxene, or scapolite. It is difficult to describe the rock in a few words as it occurs at Port Henry. It is pure limestone near the furnace, quite coarse and crystalline. The steep rock west of the public house is a mixture of yellowish serpentine and primary limestone; * * * near the dwelling of Mr. Foote, is a mixture of the same materials; the serpentine is darker and the contrast between the limestone and serpentine is greater. * * * In the same bed, in addition to the mixture already mentioned, I found those of coccolite and pyroxene in crystals, blood-red mica or mica which transmits a blood-red light, hornblende, and limestone, etc. In the midst of the bed, half a mile from the lake (Champlain), is an extensive one of calcareous spar. * * * It contains a great abundance of graphite, etc.

The typical ophiolite as put upon the market consists of a quite even granular admixture of serpentine, calcite, and dolomite in particles from one-eighth to one-fourth of an inch in diameter, interspersed with small scales of phlogopite, occasionally graphite, and more abundant pyrrohotite granules. As noted by Emmons, however, the texture is variable, and, as seen by the writer at the now abandoned quarries near the village of Port Henry, the frequent occurrence of large blotches of yellow and greenish serpentine, or serpentine and white pyroxene, in sizes from an inch to a foot or more in diameter, proved a serious drawback to the production of marketable material. From the abandoned quarry of the "Ophite Marble Company," and other openings in the vicinity, it is easy to obtain masses of the serpentine showing pyroxenic nuclei, and all stages of the alteration are readily traced. At the Ophite quarry was selected what seemed a typical sample, (70085) and from it was picked out the unaltered pyroxene and the secondary yellowish green serpentine. These, submitted to Mr. Catlett, of the U. S. Geological Survey, for analysis, yielded as follows:

	Pyroxene.	Serpentine.
SiO_2	55.36	42.17
Al_2O_3	.22	.30
Fe_2O_3	.22	1.57
FeO	.57	.64
MgO	19.53	41.33
CaO	24.48	None.
NiO	None.	None.
Cr_2O_3	None.	None.
MnO	Trace.	Trace.
H_2O		13.72
	100.34	99.73

The pyroxene is therefore a very pure lime, magnesian variety, of the formula $CaMgSi_2O_6$, and its conversion into serpentine consists, as in the other cases described, in the assumption of water and giving up its lime, which crystallizes out in the form of calcite. The resultant serpentine is also of exceptional purity. The origin of the large masses of the yellowish serpentine is thus readily accounted for. It is to be noted, however, that the serpentine occurring in small particles scattered evenly throughout the granular portion of the rock is of darker color, and so far as observed never showed under the microscope traces of residual pyroxene. Wherever, too, this darker variety of serpentine occurred in patches of any considerable size it was observed that it frequently contained inclosures of graphite scales. For the study of this variety of the rocks, material was selected from the quarry of Mr. J. E. Reed, some miles west of Port Henry. From this opening was selected four series of specimens, characteristic of the rocks as there occurring. These were (1) the merchantable ophiolite, a granular rock consisting apparently of about equal proportions of snow-white calcite and dark green serpentine (70082); (2) a similar textured rock, but of more uniform green color, the serpentine and calcite being less distinctly differentiated, and the calcite being moreover of a clear glassy appearance, and for this reason less notable; (3) masses from an inch to a foot or more in diameter, consisting mainly of deep though dull green serpentine, and often carrying large scales of graphite (70083); and (4) samples of the same shape and mode of occurrence, but consisting of a central portion or nucleus of coarse massive calcites and graphite scales, surrounded by a ring or zone of varying thickness of the dull green serpentine (70084). The last three forms occur sporadically throughout the beds, and as their presence is objectionable in the quarried blocks they are often the cause of considerable waste.

Sections from the two first-mentioned varieties showed the rock to consist essentially of calcite, serpentine, and dolomite. Rough determinations of the relative proportions of the various constituents were made by dissolving out from weighed portions of the pulverized rocks the calcite by acetic acid, the dolomite by cold hydrochloric acid, and in each case weighing the residues. Calculations from these results showed No. 1, the typical ophiolite, to consist of 52 per cent. calcite, 15 per cent. dolomite, and 33 per cent. serpentine; the second variety yielded, under like treatment, calcite 72 per cent., dolomite 2 per cent., and serpentine 26 per cent. An analysis of the dark serpentine out of the typical ophiolite (70082) from this quarry by Mr. Catlett yielded results as follows:

SiO_2	39.96
Al_2O_3	1.07
Fe_2O_3	3.53
FeO	3.85
MgO	37.61
NiO	none.
Cr_2O_3	none.
MnO	trace.
H_2	13.65
	99.67

This material it should be noted was separated out by specific gravity and subsequent treatment with acetic acid. Under the microscope the powder was of a dirty dull green color, opaque, and showed when the stage was revolved between crossed nicols a somewhat fibrous or felty structure, more like sundry chloritic decomposition products as seen in eruptive rocks than like pure serpentine.

In the thin sections this variety of the rock furnishes no clew whatever to the origin of the serpentinous material. Sections of the second variety show, however, the rock to have consisted mainly of calcite and dolomite, and that the serpentine is a subsequent injection, replacing wholly or in part the calcite. Sections are readily obtainable showing the calcite granules, with only narrow and irregular veins of the serpentinous matter traversing them, through all gradations to complete replacement. It was at first thought that these granules might be dolomitic and actually undergoing alteration into serpentine, but chemical and microscopic tests showed them to be nearly pure calcite. The third and fourth varieties mentioned above were likewise found to consist of calcite (the coarsely crystalline variety mentioned by Emmons), replaced wholly or in part by the serpentinous matter. Samples were collected, and are now installed in the Museum collections, showing these masses of graphite-bearing calcite in all stages of replacement, from the formation of a ring of serpentinous material around the outer portion (70084) through varieties stained greenish throughout but still effervescing when treated with dilute hydrochloric acid, to compact masses of dark dull green serpentine, still at times showing traces of the calcite cleavage, and carrying as before scales of embedded graphite (70083).

The writer will not attempt to fully explain the source of this dark colored aluminous serpentine, which occurs as a true replacement rather than as a metasomatic product. If, as was first supposed, it too was derived from the colorless pyroxene, it is difficult to account for the large increase (6.03 per cent.) of iron oxides and alumina. It seems best to drop the matter here for the present rather than resort to speculations, which may not be borne out by future field observations.

Thanks are due Mr. S. E. Foote, of Port Henry, but for whose generosity in giving not only his own time, but also furnishing his private conveyance, it would have been impossible in the time at command to obtain for the Museum the full set of duplicate material, the collection of which was the main object of my visit.

B.—AQUEDUCT SHAFT 26, NEW YORK CITY.

This serpentine occurs in embedded masses in a coarsely crystalline white granular dolomite. It plainly originates through the hydration of a white monoclinic pyroxene, showing under the microscope nearly rectangular prismatic cleavages, and giving extinction angles as high as 44°. The alteration is accompanied with the formation of abundant secondary calcite. The serpentinous matter itself varies from nearly white or colorless to light greenish, or occasionally nearly black; the green color is never very pronounced. The hardness of the material is a trifle under 4 of Dana's scale, being softer than the Bowenite of

Smithfield, Rhode Island, which it at times resembles. Under the microscope the serpentine shows a platy, almost fibrous structure, the plates in each case lying approximately parallel with the vertical axes of the crystals from which they were derived. These plates do not extinguish simultaneously, but the alternate bands become in a general way light and dark as the stage is revolved between crossed nicols. The dark cloud, however, sweeps over in so indefinite a manner that nothing like extinction angles are obtainable. An analysis of the serpentine matter (70350) by Mr. Catlett yielded results as below:

SiO_2	39.92
Al_2O_3	.08
Fe_2O_3	.50
MgO	42.52
CO_2	1.64
CaO	.90
Moisture (at 105°)	1.36
Ignition	13.26
	100.18

For the material examined from this locality the Museum is indebted to Mr. George F. Kunz.

C.—OLD WOLF QUARRY, CHESTNUT HILL, NEAR EASTON, PENNSYLVANIA.

This serpentine, as is well known to American collectors, is of a light oil green or yellowish color, closely resembling that of Montville, New Jersey. As noted in the reports of the Pennsylvania Survey*, it occurs associated with calcite, gray limestone, asbestus and tremolite. The pure varieties, such as find their way into the cabinets of collectors (70125), are not obtainable in masses of any size, but occur in seams or sporadically scattered throughout a massive tremolite rock which is here quarried, and, after pulverization, used as a filler in paper manufacture. A beautiful bright yellowish green vermiculite (?) also occurs here. This will be described in another paper.

The association of the serpentine with the white tremolite rock is such as to suggest a genetic relationship. Indeed, it is possible in the quarry opening to trace the gradual passage, often within the distance of a few inches, of the pure white tremolite rock into a mixed rock composed mainly of serpentine, tremolite, and calcite (specimens 70114, 70115, 70119, 70122, 70123). Thin sections of the fresh tremolite (70122) rock show a compact aggregate of white non-pleochroic, somewhat fibrous crystals, with the cleavage of hornblende and giving extinctions on clinopinacoidal sections running as high as 20°. As serpentinization has set in the tremolite crystals are broken up into fibrous aggregates traversed by irregular canals of the serpentinous matter, the direction of which has been but little controlled by the cleavage lines of the mineral. The method of alteration corresponds closely to that described by L. P. Gratacap as having taken place in the amphibolic rocks lying between Fifty-fifth and Sixtieth street, New York city.*

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* Rep. D^3, Second Geol. Survey of Pa., p. 79.

An analysis of the tremolite, separated out from the fresh pulverized rock (70122), yielded Mr. Eakins as follows:

	Per cent.	Ratio.
SiO_2	58.27	.97
Al_2O_3	.33	....
Fe_2O_3	trace	....
MnO	.08	.965
CaO	11.90	
MgO	25.93	
K_2O	.42	
Na_2O	1.25	
H_2O	1.22	

As above noted, the pure compact serpentine occurs only in veins associated with snow-white calcite. The main mass of the rock is of a dull greenish hue and consists of a mixture of serpentine, secondary calcite, vermiculite, and remnant shreds of tremolite.

NATIONAL MUSEUM, *June*, 1889.

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*Am. Jour. Sci., 3, XXXIII, 1887, p. 374.

A REVISION OF THE GENUS ARAUCARIOXYLON OF KRAUS, WITH COMPILED DESCRIPTIONS AND PARTIAL SYNONYMY OF THE SPECIES.

BY

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Having recently had occasion to identify several species of fossil wood showing the Araucaria-like structure from the Potomac formation of Virginia,* the Jurassic of Arizona and New Mexico,† and the Devonian of New York, considerable difficulty was experienced in readily referring to the published descriptions and figures. As a matter of personal convenience a card index was prepared, containing references to the principal descriptions and illustrations. The preparation of this index suggested the idea that other workers in the same field must have experienced similar needs, and this has led to its expansion into the following partial revision and description of the accepted species.

The literature of the subject may be said to date from the publication of Witham's work on the "Internal Structure of Fossil Vegetables," which appeared in 1832. From that time until the present more than fifty species have been established, the descriptions and figures of which are scattered through various foreign periodicals, or occur in the systematic works of Dawson, Göppert, Unger, Kraus, Felix, and others. From these sources the principal synonymy has been compiled, together with the description of the species.

The first systematic enumeration of species was that given by Endlicher in 1847 in his "Synopsis Coniferarum." He there describes fourteen species that have since been referred to the Araucarian type. Unger, in his "Genera et Species Plantarum Fossilium," published in 1850, enumerates about the same number of species. The most extensive compilation is that given by Kraus in Schimper's "Traité de Paléontologie Végétale," Vol. II, published in 1870–'72. He here established the genus *Araucarioxylon*, and gives a list of thirty-two species derived from the older genera *Araucarites*, *Dadoxylon*, *Pissadendron*, etc. None of these species are accompanied by descriptions, and the synonymy is also in some cases wrong. The following paper embraces fifty species, the additional ones having been mostly detected since the publication of Kraus's paper, although a few are evident omissions from it.

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* Bull. U. S. Geol. Survey, No. 56, p. 50, Pl. VII, figs. 2–5.

† Proc. U. S. Nat. Mus., 1888, pp. 1–4, Pl. I.

As above mentioned, it was originally intended to present in this paper only the descriptions and principal references of the well-known forms, and bring it as nearly as possible up to date, by including the species that had been described since the publication of Kraus's paper. But early in this work it became evident that the investigation of Paleozoic woods by Grand'Eury and Renault, and later by Morgenroth, Vater, and Felix, have made certain changes necessary in the genus *Araucarioxylon* as defined by Kraus. These investigations show very conclusively that it must be divided into two parts, and the later studies of Felix make it equally clear that the present state of our knowledge is sufficient to amply justify its division into three parts.

As the evidence which had led to the separation of *Cordaites* from *Araucarioxylon* is of considerable interest, it is presented somewhat *in extenso.*

CORDAITES Unger.

The name *Cordaites* was first employed by Unger in 1850.[*] It was founded principally upon the leaves, and Unger admitted but a single species (*C. borassifolius*), which had previously been described by Sternberg[†] (1820–'25), first as *Flabellaria borassifolia* and later as *Cycadites palmatus*.[‡] Sternberg, it will be observed, had regarded the first as a palm, the latter as a cycad.

The first to investigate the internal structure was Corda,[§] who in 1845 created the Flabellariaceæ for the species of Sternberg. He devoted a large plate to the elucidation of the internal structure, but as his specimens had not been well preserved he fell into error in his interpretation of the histological elements. He compared them in habit to *Aletris* and *Dracæna*, but regarded the internal structure as similar to *Lomatofloyos* of the Lycopodiaceæ, and Unger, in his work above cited, placed *Cordaites* in the Lycopodiaceæ on this account.

In 1848 Germar[||] obtained a second species from Wettin in Germany, which he referred to *Flabellaria* observing that it was very closely allied to *F. borassifolia* of Sternberg. Unger, however, regarded it as a true palm, and retained it in the genus *Flabellaria*, although subsequent investigation has shown that Germar was correct in regarding it as allied to *Cordaites*. In the following year Brongniart published his celebrated "Tableau des generes de Végétaux fossiles,[¶] in which he clearly for the first time divined the true systematic relationships of these plants. He established the genus *Pychnophyllum* for *Flabellaria borassifolia* of Sternberg and placed it with the genus *Nœggerathia*, in the new family Nœggerathieæ, which he regarded as being related on the one hand to the Cycads and on the other to the Conifers. He placed it between these two families, and described at some length the form, nervation, and insertion of the leaves, but fell into the same error that Corda had in supposing that it was destitute of medullary rays.

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[*] Gen. et sp. Plant. foss., p. 277.

[†] Versuch., I, fasc. 2, p. 27, Pl. XVIII; fasc. 4, p. 34.

[‡] *Op. cit.*, I, fasc. 4, p. 32, Pl. XL.

[§] Beiträg. Fl. d. Vorweldt, p. 44, Pls. XXIV, XXV.

[||] Versteia. d. Steinkohlgeb. Wettin u. Löbjun, p. 56, Pl. XXIII.

[¶] In Dictionnaire univ. d'Hist. Nat., Vol. XIII, pp. 113–115.

There can be no doubt that this is the first correct reference of these plants to their true systematic position, and by the law of priority Brongniart's name, *Pychnophyllum*, should be the accepted one, and, indeed, Schimper* has reinstated it, but Unger's name, *Cordiates*, has obtained such wide acceptance, both in this country and Europe, that it is not within the scope of the present paper to insist upon changing it.

Göppert† was the next to take up the Nœggerathieæ, but he followed the older writers in relegating it to the Monocotyledons. His mention of *Pychnophyllum* was brief and unimportant, the main part being taken up with a description of the then known species of *Nœggerathia*.

In 1855 Geinitz's work appeared on the carboniferous plants of Saxony.‡ In this the Nœggerathieæ were again correctly referred to the Dicotyledons being placed next to the Cycads, and Unger's name *Cordiates* was restored in place of *Pychnophyllum*, which latter name had in some unaccountable manner begun to be quoted as 1852. This would of course give *Cordaites* priority, and is probably the reason it has been so generally accepted. Certain it is that from this time it has been, with the exception of Schimper, noted above, the accepted name, and there has also apparently been little or no question as to its dicotyledonous nature, although Ettingshausen, in a paper published in the same year (1855), placed it in the Lycopodiaceæ.

Geinitz reduced the following genera to *Cordaites*, or rather pointed out that they were the names that had been applied to the different parts of this plant: *Flabellaria* ex. p. Sternberg, *Rhabdotus* Presl, *Sternbergia* Artis, *Artisia* Sternberg, *Pychnophyllum* Göppert 1852.§ He mentioned only two species viz: *C. principalis* German sp. and *C. borassifolius* Sternberg sp.

In his Dyas‖ Geinitz enumerated two additional species, while Göppert admitted but two from the Permian in his flora¶ of that formation published in 1864–'65. In 1870–'72 Schimper,** as stated above, restored the name *Pychnophyllum*, but was at that time only able to enumerate four species. In the third volume of his Traité published in

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* Traité Pal. Vég., Vol. II, p. 190.

† Foss Fl. d. Uebergansgeb. 1852, pp. 209-220.

‡ Verstein. d. Steinkohenfl. in Lochsen, p. 40.

§ Steinkohlfl. von Radnitz in Bohm.

‖ Dyas oder d. Zechsteinform. u. d. Rothliegende, 1862, pp. 148, 149.

¶ Foss. Fl. d. Perm. Form., pp. 159, 160.

** Pal. Vég., Vol. II, pp. 190-192.

1874, he however mentions * four or five additional species, that had been made known since the publication of the first notice, mostly by Dawson from the carboniferous of Canada and Nova Scotia. In the latter volume he speaks of the investigations that were just being undertaken by Brongniart on the silicified seeds of St. Étienne, and also of a verbal communication made to the Academy of Sciences by Grand 'Eury concerning the discovery of forests of *Cordaites* in the Loire basin.

The results of Grand'Eury's investigations were published in 1877 in his now justly celebrated "Mémoire sur la Flore carbonifère du Départment de la Loire." From this copious material, fortunately discovered in Central France, he was able for the first time to supply a complete history of *Cordaites*, including the leaves, branches, trunks, flowers, and seeds.

As the internal structure of the trunks and branches is the primary subject under discussion, our attention will hereafter be given entirely to this phase of the subject. The center of the trunk Grand'Eury found to be occupied by a very large pith, with which he was able to connect the heretofore largely problematical organisms known as Artisia (*Sternbergia* Artis). *Artisia*, as generally known, consists of a structureless cylinder, marked on the outside by numerous ridges or wrinkles, which as long ago as 1846 Dawes had suggested might be the cast of the medullary cavity of some plant possessing a pith similar to some living members of the Juglandaceæ, Euphorbiaceæ, etc. Dawson had also obtained specimens from the Carboniferous of Canada that pointed to the medullary origin of *Artisia*, but was in doubt as to the plants uniformly producing them, and from exceptionally well preserved specimens in England Williamson was able to establish the connection between *Artisia* and an undoubted *Dadoxylon*, but it was left for Grand'Eury to show its connection with *Cordaites*. According to him the larger trunks inclosed an *Artisia* pith having a diameter of from .05 to .08 or even .10^{mm}, while in the branches it varied from .03 to .01^{mm}.

Surrounding this pith was a dense woody zone, which was in its turn surrounded by a very thick bark. This woody zone on its inner edge, when in contact with the pith, was composed of tracheïds which were provided with transverse striations and forming typical pseudo-scalariform tissue, gradually changing outwardly to true punctate tissue. These punctations were arranged in from one to four or five longitudinal rows, and when in more than one row becoming alternate and hexagonal by mutual pressure. These pits were perforated by an elliptical or circular pore, the form of the inner pore depending evidently somewhat upon age and also upon the state of preservation of the specimen. These punctations were confined to the radial walls of the cells, and, unlike some living Conifers, each cell was always provided with them. Percoursing between these tracheïds were numerous short medullary rays connecting the pith and bark.

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* Pal. Vég., Vol. III, pp. 560–564.

This description coincides, it will be observed, with the descriptions of species of *Dadoxylon*, particularly with what Williamson has described as a typical *Dadoxylon*.* Indeed, there can be no doubt that some, at least, of the Paleozoic forms referred to *Dadoxylon* really represent the wood of *Cordaites*.

But the classic memoir of Renault, "Structure Comparée à quelques tiges de la Flore Carbonifère," which appeared in 1879, must remain the most valuable contribution to our knowledge of the genus Cordaites. From a study of the very perfectly preserved specimens collected in the vicinity of Atun and St. Étienne, he was able to make out the cellular structure of the immense pith, of the medullary rays, of the wood cells showing the hexagonal aræolation, and also of the very thick bark. Likewise the structure of the leaves, the development of the male flower, manner of fertilization, and growth of the ovule were clearly described, so that we actually have a more complete knowledge of this long-since extinct genus than of many living genera. Renault proposes to place it as a distinct family between the Cycads and Conifers, being related, as Schenck has pointed out, by the male flowers to the Salisburieæ, by the female flowers to the Cycads, while in the structure of the wood it can hardly be distinguished from the Conifers.

It being now acknowledged that there is a genus showing Araucaria-like structure, yet unquestionably distinct from it, it becomes necessary to inquire if there are characters which can be used to distinguish them when there is not a sufficient amount of material to settle this macroscopically. According to Grand'Eury and Renault, and also by Morgenroth, Vater, and Felix, who have taken up the subject within a few years, there undoubtedly are characters that may be relied upon to separate Cordaites from the other Paleozoic woods. The possession of an Artisia pith is a clear indication that the example belongs to *Cordaites*, since, as stated above, Grand'Eury has always found the Artisia pith associated with *Cordaites* when the specimen has been entirely preserved. In all the species that have been described by Renault, Felix and others as typical, the punctations have entirely covered the radial walls of the tracheïds. There are several other minor characters that will be enumerated when we come to the detailed description of the species.

Having settled that *Cordaites* must be separated from the genus *Araucarioxylon* of Kraus, the further question arises as to what is to be done with the remaining forms. According to the best recent authorities, as Shenck, Felix, Lesquereux, Morgenroth, and Fontaine, the true Conifers of the Araucarian type do not extend into the Paleozoic. The Araucariæ first had their origin in the Jurassic, or in any case in the Mesozoic, and here the trunks are for the first time found associated with undoubted leaves and cones of the Araucarian type.

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*Organization Foss. Pl. Coal-meas., VIII, p. 222.

The so-called *Araucarites gracilis*, described by Dawson from the Carboniferous and Permian of Canada, is without much doubt a species of *Walchia*, a well-known Permian genus.

As the Mesozoic and Tertiary forms are manifestly the only ones that can be justly referred to *Araucaria*, Felix has proposed* to confine the use of *Araucarioxylon* of Kraus to woods from these formations. This seems on the whole a desirable change and quite in harmony with modern views.

There now remain the Paleozoic forms not included in the genus *Cordaites*. As they can not of course be called either *Cordaites* or *Araucarioxylon*, Felix has proposed† to restore Endlicher's name—*Dadoxylon*—for them. The term Dadoxylon, meaning simply ancient wood, is a very good one for these woods, inasmuch as it is non-committal, and the former may be changed from it at any time provided their true relationship may be made out. They are probably to be regarded as the ancestors of the true Araucariæ, although the discovery of more perfect material may possibly show them all to be related to or included in the Cordaiteæ.

CORDAITES‡ Unger.

1. **Cordaites Ouangondianus** (Dn.) Göpp.

Göppert in Nachträge z. Kenntniss d. coniferenhölzer d. Paleoz. Form., 1888, p. 9.
Dadoxylon Ouangondianum Dawson, Can. Nat., Vol, VI, 1861, p. 165, figs. (in text) 1-4.
Araucarioxylon Ouangondianum (Daws.) Kidston. Cat. Brit. Mus., 1886, p. 237.

Branching trunks with distinct zones of growth and a pith of Artisia (Sternbergia) type; wood cells very large, with three to five rows of contiguous alternate hexagonal areoles with oval pores; medullary rays with one to three series of cells and as many as fourteen rows of cells superimposed on each other (Dawson.)

Middle Erian (Devonian) formation, of Canada.

2. **Cordaites Halli** Dn. Sp.

Dadoxylon Halli Dawson. Quat. Jour. Geol. Soc. Lond., Vol. XVIII, 1862, p. 306, Pl. XIII, fig. 11; Foss. Pl. Devonian and Silurian Formations of Canada, 1871, p. 14, Pl. I, figs. 5, 6.

Wood cells very large, with five rows of contiguous alternate hexagonal areoles; medullary rays very frequent, and with as many as thirty rows of cells superimposed. (Dawson.)

Hamilton group, Hemlock Creek, Ontario County, New York.

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*Abhandl. d. k. geol., Landes-Anstalt, Bd. VII, 1886, p. 209. (Page 57 of reprint.)

† *Op. cit.*, p. 209.

‡ Felix and others write *Cordaïoxylon*, but in view of what has been brought out in the preceding pages regarding the completeness of our knowledge of the life history of *Cordaites*, it does not seem expedient to use different generic names to designate simply different parts of the same plant. Göppert in his last work also adopted this view and wrote *Cordaites* for the species founded upon internal structure, as well as for those founded upon other parts of the plants.

3. Cordaites Newberryi Dn. Sp.

Dadoxylon Newberryi Dawson. Foss. Pl. Devonian and Upper Silurian Formations of Canada, 1871, p. 14, Pl. I, figs. 7–9; Newberry, Devonian plants from Ohio, Journ. Cincin. Soc. Nat. Hist., Vol. XII, 1889, p. 53, Pl. VI, figs. 3, 3*a*, 3*b*.

Cells more slender than in the last species; areoles in two or three rows with large oblique pores; medullary rays very numerous, of about eighteen rows of narrow cells in two series. (Dawson.)

Hamilton group, Ohio.

4. Cordaites Clarkii Dn. Sp.

Dadoxylon Clarkii Dawson. Foss. Pl. Erian (Devonian) and Upper Silurian Formation of Canada, 1882, p. 125.

Wood cells provided with two to three rows of slit-form bordered pores in hexagonal borders; medullary sheath of pseudo-scalariform and reticulated fibers; medullary rays numerous, short, and simple, with sometimes as few as four cells superimposed. (Dawson.)

Genesee shale, Canandaigua Lake, New York.

5. Cordaites Brandlingii (Lindl. & Hutt.) Göpp.

Göppert Nachträge z. Kenntniss d. coniferenhölzer d. Paleoz. Form., 1888, p. 12, Pl. I, figs. 1–4.

Pinites Brandlingii Lindl. & Hutt. Foss. Flora Great Britain, 1830, Vol. I, p. 1, Pl. I; Witham Entern. Struct., p. 73, Pl. IX, figs. 1–6; X, figs. 1–6; XVI, fig. 3.

Araucarites Brandlingii Göpp., in Bronn Gesch. d. Nat., Vol. III, p. 42.

Dadoxylon Brandlingii Endlicher, Synop. Conif., 1847, p. 299.

Araucarioxylon Brandlingii Kraus, in Schimp. Pal. Vèg., Vol. II, p. 382.

Cordaioxglon Brandlingii Felix, Sitzb. d. Natf. Gesell. Leipzig, 1882, Bd. IX, p. 6.

Trunk branching, with large medulla; the concentric rings obsolete; tracheïds amply provided with bordered pits, which are in two to four, rarely one to five, contiguous, alternating series; inner pores oblong; medullary rays in a single or rarely in two series of two to forty superimposed cells. (Göppert.)

Very widely distributed species, occurring at Wideopen, near Gosforth; Hill Top, near Ushaw; Westgate, near New Castle; Newbeggin, Northumberland; Waldenburg, in Silesia; Saarbrücken; Central France, etc.

6. Cordiates medullosus Göpp.

Göppert in Nachträge z. Kenntness d. coniferenhölzer d. Paleoz. Form., 1888, p. 22, Pl. I, fig. 11; II, figs. 12–24; III, figs. 25, 26.

Araucarites medullosus Göppert, Foss. Fl. d. perm. Form., 1864–'65, p. 259, Pl. LX, figs. 3–8.

Araucarioxylon medullosum Kraus, in Schimp. Pal. Veg., II, p. 383.

Trunks branching; medulla large, in the smaller branches of different ages the woody body becomes narrower, transversely septate; concentric circles obsolete; tracheïds pitted, the pits in one to two, rarely three to four rows, alternating, approximating or contiguous, small; medullary rays simple, usually of four to six, rarely one to eighteen, superimposed cells. (Göppert.)

Permian formation. Chemnitz.

7. Cordaites intermedius Grand'Eury Sp.

Dadoxylon intermedium Grand'Eury. Mém. sur la Fl. carbonif. d. Dep. la Loire, 1877, p. 264.

Tracheïds provided with three or four series of hexagonal pits; medullary rays composed of two layers of superimposed cells. (Grand-'Eury.)

This species is regarded by Grand'Eury as being intermediate between *C. Brandlingii* and *C. Acadianum* Dn. sp.

Carboniferous. Central France.

8. Cordaites Stephanense Grand'Eury Sp.

Dadoxylon Stephanense Grand 'Eury. Mém. sur la Fl. carbonif. d. Dep. la Loire, 1877, p. 265.

Tracheïds small, provided with one or two rows of pores; medullary rays not abundant, short, composed of a single layer of from one to three small superimposed cells. (Grand'Eury.)

Carboniferous formation, Central France.

9. Cordaites Subrhodeanum Grand'Eury Sp.

Dadoxylon Subrhodeanum Grand'Eury Sp. Mém. sur la Fl. carbonif. d. Dep. la Loire, 1877, p. 266.

Tracheïds extremely small, provided with a single row of pores; medullary rays of from ten to thirty superimposed cells. (Grand'Eury.)

Carboniferous formation, Central France.

10 ? Cordaites Acadianum Dn. Sp.

Dadoxylon Acadianum Dawson, Can. Nat. 1863, Vol. VIII, p. 433. Quart. Jour. Geol. Soc. Lond., 1866, Vol. XXII, p. 145, Pl. V, figs. 4–6.

Araucarioxylon Acadianum Kraus in Schimp. Pal. Vég., Vol. III, p. 577.

Large trees, usually silicified or calcified, with very wide wood cells, having three or more rows of small hexagonal areoles, each inclosing an oval pore; cells of the medullary rays one-third the breadth of wood cells, and consisting of twenty or more rows of superimposed cells in two series. Rings of growth indistinct. (Dawson.)

Middle coal-measures, Joggins, Port Hood, Dorchester.

11. Cordaites materiarum Dn. Sp.

Dadoxylon materiarum Dawson, Can. Nat., 1863, Vol. VIII, p. 433. Quart. Jour. Geol. Soc. Lond., 1866, Vol. XXII, p. 145, Pl. V, figs. 7–9.

Wood cells less wide than those of *A. Acadianum*, with two to rarely four rows of hexagonal pores. Medullary rays very numerous, with twenty or more rows of cells superimposed in one series. Rings of growth slightly marked. Approaches *C. Brandlingii*, but with the medullary rays much longer. (Dawson.)

Middle and upper coal-measures, Joggins, Malagash, Pictou, Glace Bay, Miramichi, etc.

DADOXYLON Endlicher.

Araucarites Presl. *Araucarioxylon* Kraus.

1. Dadoxylon Beinertianum Endl.

Endlicher, Syn. Conif., p. 300.

Araucarites Beinertianus Göppert, Foss. Fl. Schles. in Wimmer's Fl. v. Schles. ed. 2, Vol. II, p. 218; Monog. d. Foss. Conif., p. 233. Pl. XLII, figs. 1–3; XLIII, fig. 1.

Araucarioxylon Beinertianum Kraus in Schimp. Pal. Vég., Vol. II, p. 381.

Annual rings evident; tracheïds broad, thin walled; pores in one to four series, approximate; medullary rays in a single series of from one to ten superimposed cells. (Göppert.)

Subcarboniferous formation, Falkenburg, in Silesia.

2. Dadoxylon Tchichatcheffianum Endl.

Endlicher, Syn. Conif., p. 300.

Araucarites Tchichatcheffianus Göppert in Tchichatcheff, Voyage dans l' Altai, p. 389; Monog. d. Foss. Conif., p. 235.

Concentric circles distinct, broad, equal; tracheïds with one to four series of hexagonal pores; medullary rays in a single series, similar. (Göppert.)

Subcarboniferous formation, Russia.

3. Dadoxylon Buchianum Endl.

Endlicher, Syn. Conif., p. 300.

Protopitys Buchiana Göppert, Monog. d. Foss. Conif., p. 229, Pl. XXXVII, figs. 4–7; XXXVIII, figs. 1, 2.

Araucarioxylon Buchianum Kraus, in Schimp. Pal. Vég., Vol. II, p. 381.

Concentric circles indistinct; tracheïds prosenchymatose, rather thick-walled; pores contiguous, compressed, in a single series, not observed on walls parallel to the medullary rays; medullary rays simple, of a single row of superimposed cells. (Göppert.)

Subcarboniferous formation, Frankenberg, in Hesse.

4. Dadoxylon Vogesiacum Ung.

Unger in Köchlin-Schlumb. et Schimp., Terr. de trans. des Vosges, p. 342, Pl. XXX, figs. A, 1–4.

Concentric circles apparent to the naked eye, nearly 1^{mm} broad; medullary rays in transverse section appear numerous; tracheïds provided with one or two rows of pores which are contiguous and rounded when in a single series, irregularly hexagonal when in two series; medullary rays numerous, composed of a single layer of superimposed cells. (Unger.)

Grauwacke, of Niederburbach.

5. Dadoxylon ambiguum Endl.

Endlicher, Syn. Conif., p. 299.
Pinites ambiguus Witham Intern. Struct., p. 73, Pl. IX, figs. 7, 8; X, figs. 7–9.
Araucarites ambiguus Göpp. in Tchichatcheff Voyage dans l'Altai, p. 389.
Dadoxylon Unger in Köchlin-Schlumb. et Schimp., Terr. de trans. des Vosges, p. 343, Pl. XXX, figs A, 1–4.

Concentric circles evident; the medullary rays in transverse section appear numerous and large; tracheïds provided with two to three, or rarely four, rows of contiguous hexagonal pores; medullary rays composed of two or rarely three layers of superimposed cells. (Unger.)

Carboniferous formation, Gateshead, England, and Grauwacke, Niederburbach.

6. Dadoxylon angustum Felix Sp.

Araucarioxylon angustum Felix. Stud. über Foss. Hölzer. Inaug. Diss. Leipzig, 1882, p. 81.

Annual rings plain; tracheïds provided with one or two rows of small pores on the radial walls; medullary rays moderately high, composed of small narrow cells. (Felix.)

Carboniferous formation, Lake Illawarra, south of Sidney, New South Wales.

7. Dadoxylon annulatum Dn.

Dawson, Can. Nat., 1863, Vol. VIII, p. 433; Quart. Jour. Geol. Soc. Lond., Vol. XXII, p. 146, Pl. V, figs. 10–13.

Wood cells with two or three rows of hexagonal disks; medullary rays of twenty or more cells superimposed, in two series; wood divided into distinct concentric circles, alternating with layers of structureless coal, representing cellular tissue or very dense wood. (Dawson.)

Middle coal-measures, Joggins.

8. Dadoxylon antiquum Witham Sp.

Pitus antiqua Witham, Intern. Struct., 1833, p. 71, Pls. III, IV, figs. 1–7; VII, figs. 9–12; VIII, figs. 1–3; XVI, figs. 9–10.
Pissadendron antiquum Unger, Chlor. Prot., p. 29; Göppert Monog. d. Foss. Conif., p. 230, Pl. XXXVIII, figs. 3–6.

Concentric circles usually indistinct; tracheïds rather thick, the radial walls reticulated with two or three series of roundish areoles, which are separated from each other; medullary rays composite, consisting or four or five series of superimposed cells. (Göppert.)

Carboniferous formation, Lennel Braes and Tweed Mill, Berwickshire, England.

9. Dadoxylon medullare Endl.

Endlicher, Syn. Conif., p. 298.
Pinites medullaris Witham, Trans. Nat. Hist. Soc., Northumb., etc., Vol. I, p. 297; Pl. XXV, figs. 3–8; Intern. Struct., 1833, p. 72, Pl. VI, figs. 5–8; VII, figs. 7, 8.

Concentric circles obsolete; tracheïds provided with two to four series of contiguous areolæ; medullary rays of two to four series of superimposed cells. (Witham.)

10. Dadoxylon antiquius Dn.

Dawson, Can. Nat., Vol. VIII, 1863, p. 433; Quart. Jour. Geol. Soc. Lond., Vol. XXII, 1866, p. 146, Pl. V, figs. 1–3.

Wood cells narrow, thick-walled, provided with two to three rows of pores; medullary rays of three to four series of cells, with twenty or more superimposed, nearly as wide as the wood cells; rings of growth visible. (Dawson.)

Coal measures, Horton.

Dadoxylon Schrollianum Göpp. Sp.

Araucarites Schrollianus Göppert. Jahrb. d. Geol. Reichsanstalt. Wien, 1857, p. 7; Foss. Fl. d. Perm. Form., p. 248.

Concentric circles evident, one-quarter to two lines broad; tracheïds ample, moderately thin-walled, the pores in a single contiguous series; medullary rays small, in a single or rarely in two series of from one to fifty superimposed cells. (Göppert.)

Permian formation (Grès rouge), Bohemia, Silesia, Chemnitz in Saxony, Thuringia, etc.

12. Dadoxylon stigmolithos Endl.

Endlicher, Syn. Conif., p. 300.

Araucarites stigmolithos Göppert, in Index. Paleont., Vol. I, p .120; Foss. Fl. d. Perm. Form., p. 249; Göpp. in Mougeot, Essai d'une Fl. d. Nouv. Grès Rouge, p. 28, Pl. III, figs. 6, 7.

Concentric rings obsolete; tracheïds broad, thin-walled, provided with one to three series of small, strictly contiguous pores; medullary rays simple, of one to twenty superimposed cells. (Göppert.)

Permian formation, Bohemia, Saxony, and Frankreich of Val d'Ajol.

13. Dadoxylon stellare Ung.

Unger, Gen. et Spec. Pl. Foss., p. 380.

Araucarites stellaris Göppert, Foss. Fl. d. Perm. Form., p. 250.

The medulla large, stellate in outline; rings obsolete or 5 to 8^{mm} broad; tracheïds equal, narrow, thick-walled, provided with a single row of small, contiguous pores; medullary rays simple, of two to thirty-three superimposed cells. (Unger.)

Permian formation, Chemnitz in Saxony.

14. Dadoxylon Valdejolense Moug. Sp.

Araucarites Valdejolensis Mougeot, Essai d'une Fl. d. Nouv. Grès Rouge, p. 27, Pl. III, figs. 1–7; Göppert, Foss. Fl. d. Perm. Form., p. 250.

The medulla large, round (?) in outline; rings distinct; tracheïds equal, provided with two, rarely three, rows of small, contiguous pores; medullary rays numerous, simple, composed of one to twenty superimposed cells. (Göppert.)

Permian formation, Val d'Ajol.

15. Dadoxylon Rollei Ung.

Unger, Der Versteint. Wald b. Cario, u. s. w., Sitzb. d. mathem-naturw. Cl. d. Akad. zu Wien, Vol. XXXIII, 1858, p. 230, Pl. II, figs. 6-8.
Araucarites Rollei (Ung.) Göppert, Foss. Fl. d. Perm. Form., p. 250.

Concentric circles even, obscure; tracheïds ample in size, thick-walled, provided with two to three series of small, strictly contiguous pores; medullary rays simple or partly composed of two series of two to forty superimposed cells. (Unger.)

Permian formation, Erbstadt near Bönstadt in the Wetterau.

16. Dadoxylon Richteri Ung.

Unger, Der Versteint. Wald b. Cario, u. s. w., Sitzb. d. mathem-naturw. Cl., d. Akad. Vol. XXXIII, 1858, p. 230, Pl. II, figs. 9-11.
Araucarites Richteri (Ung.) Göppert, Foss. Fl. d. Perm. Form., p. 251.

Concentric circles even, obscure; tracheïds narrow, thick-walled, provided with one to two or three series of small subcontiguous pores; medullary rays simple, composed of one to eighteen superimposed cells. (Unger.)

Permian formation, Saalfeld in Thuringia.

17. Dadoxylon Saxonicum Geinitz Sp.

Araucarites Saxonicus Geinitz. Leit. pfl. d. Rothlieg., p. 25; Göppert, Foss. Fl. d. Perm. Form., p. 251, Pl. LIV; LV; LVI, figs. 2-4; LX, figs. 1, 2.

Concentric circles distinct; tracheïds large, provided with five series of spirally disposed, hexagonal pores; medullary rays in a single series of five to thirty superimposed cells. (Göppert.)

Permian formation, Saxony.

18. Dadoxylon pachytichum Göpp. Sp.

Araucarites pachytichus Göppert. Foss. Fl. d. Perm. Form., 1864-'65, p. 257, Pl. LVII, figs. 6-9.

Concentric circles distinct; tracheïds with the walls so thick as to almost obliterate the lumen; walls provided with three to five series of hexagonally compressed pores; medullary rays composed of a single series of from five to twenty cells. (Göppert.)

Permian formation, Saxony.

19. Dadoxylon Rhodeanum Göpp. Sp.

Araucarites Rhodeanus Göppert in Wimmer. Fl. von Schlesien, Vol. II, p. 218; Monog. d. Foss. Conif., 1850, p. 235, Pl. XLIII, figs. 6-7; Foss. Fl. d. Perm. Form., 1864-'65, p. 256, Pl. LVII, figs. 1-5.

Concentric circles evident; tracheïds moderately thick walled, provided with one to two series of contiguous pores; medullary rays simple, of one to many cells superimposed. (Göppert.)

Permian formation, Silesia.

20. Dadoxylon Fleurotii Mougeot Sp.

Pinites Fleurotii Mougeot Essai d'une Flore du Nouv. grès rouge d. Vosges, 1851, p. 26, Pl. III, figs. 2–5.

Araucarites Fleurotii (Moug.) Göppert. Foss. Fl. d. Perm. Form., 1864–'65, p. 257.

Concentric circles distinct; tracheïds narrow, provided usually with a single row of contiguous angular pores, sometimes with two rows of alternating pores; medullary rays in a single series of from four to six superimposed cells.

21. Dadoxylon Permicum Merckl. Sp.

Araucarites Permicus Mercklin. Paleodendrol. Ross. 1856, p. 53, Pl. X, figs. 6–10; Göppert, Foss. Fl. d. Perm. Form., 1864–'65, p. 258.

Concentric circles broad, irregular, scarcely distinct; tracheïds ample, usually six-sided, thin walled, provided with two to four, rarely five, series of contiguous, hexagonal pores, with minute inner pores; medullary rays equal, thick, many-pored, simple, composed of one to twenty, rarely forty, or more superimposed cells. (Mercklin.)

Permian formation, Russia.

22. Dadoxylon cupreum Göpp. Sp.

Araucarites cupreus Göppert. Monog. d. Foss. Conif., 1850, p. 233, Pl. XLIII, figs. 2–4; Foss. Fl. d. Perm. Form., 1864–'65, p. 258.

Concentric circles nearly obsolete; tracheïds ample, moderately thin walled, provided with one to two series of spirally arranged pores; medullary rays flexuous, composed of a single series of from one to ten large cells. (Göppert.)

Permian formation, Western Urals.

23. Dadoxylon biarmicus Kutorga Sp.

Peuce biarmica Kutorga, Verhandl. d. k. minerolog. Gesell., zu St. Petersburg, 1842, p. 9–11, Pl. II, figs. 4, *a*, *b*, *c*, *d*.

Araucarites Kutorga Mercklin. Paleodendrol. Ross, 1856, p. 56; Göppert, Foss. Fl. d. Perm. Form., 1864–'65, p. 258.

Concentric rings distinct; tracheïds large, six-sided, thin walled, provided with one, rarely two, series of small four to six angled pores; medullary rays in a single series of from four to ten superimposed cells. (Göppert.)

Permian formation, Gov. Perm, Russia.

24. Dadoxylon Ægyptiacum Ung.

Unger, Der Versteint. Wald b. Cairo, u. s. w., Sitzb. d. Mathem-Naturw. Cl., 1858, p. 228, Pl. I, figs. 3–5.

Araucatites Ægyptiacus (Ung.) Göppert. Foss. Fl. d. Perm. Form., 1864–'65, p. 259.

Araucarioxylon Ægyptiacum Kraus. See Schenk. Foss. Hölz. d. Liby. Wüste. in Palæontographica, vol. XXX, 1883, p. 3, Pl. I, figs, 1, 2; II, figs. 3.

Concentric rings indistinct; tracheïds large, thick walled, provided with two to three series of small pores; medullary rays simple, formed of one to six superimposed cells. (Unger.)

Formation doubtful, possibly Cretaceous, near Cairo, Egypt.

25. Dadoxylon Keuperianum Endl.

Endlicher, Syn. Conif., p. 299. *Araucarites Keperianus* Göppert, Monog. d. Foss. Conif., p. 234.

Concentric rings obsolete; tracheïds rather narrow, thin walled, provided with one to two series of small, strictly contiguous pores; medullary rays simple or compound, of two to fifty superimposed cells in one or two series. (Göppert.)

Permian formation, Franconia and Würtemberg.

26. Dadoxylon Thuringiacum Born. Sp.

Araucarites Thuringiacus Borneman, Org. Reste. d. Lettenk. Thuring., 1856, p. 61, Pl. II, III, figs. 1–8.

Concentric rings indistinct; wood cells thick walled, narrow, lumen small; walls provided with one to two series of contiguous, round or slightly angular pores; medullary rays composed of a single series of from one to twelve superimposed cells.

1. Araucarioxylon Arizonicum Knowlton.

Proc. U. S. Nat. Mus., vol. XI, 1888, pp. 1–4, Pl. I.

Araucarites Möllhausianus? Göpp., in Möllhausen's Tagebuch einer Reise vom Mississippi nach den Küsten d. Südsee. Leipzig, 1858, p. 492.

Annual ring not apparent to the naked eye, but under the microscope observed to be present, the yearly growth being separated by a layer of two to five tangentially compressed cells; tracheïds with moderately thick walls, which are provided on the radial sides with a single row of large contiguous pores or rarely with two rows of alternating pores, and on the tangential sides with numerous separated, perfectly round, small pores; medullary numerous composed of a single series of one to twenty-two short superimposed cells; resin ducts none. (Knowlton l. c.)

HABITAT.—Triassic or lower Jurassic, near Fort Wingate, New Mexico; Lithodendron Creek and Chalcedony Park, Arizona.

2. **Araucarioxylon Edvardianum** Dn. Sp.

Dadoxylon Edvardianum Dawson. Rept. on Geol. Struct and Mineral Resources of Prince Edward Island; Montreal, 1871, p. 45, Pl. III, figs. 25–27.

Trunks without distinct rings of growth, and with a central Pith not observed to have transverse laminæ. Wood cells with one, or rarely two, of contiguous hexagonal areoles. Medullary rays simple, infrequent, with two to ten rows of cells superimposed.

HABITAT.—Triassic, Prince Edward Island.

3. **Araucarioxylon Wurtembergiacum** Kraus.

Schimp. Pal. Vég. II, p. 384.
Pinites Würtembergiacus Göppert. Monog. d. Foss. Conif., 1850, p. 212.

Concentric circles (nearly 10mm broad) indistinct; tracheïds equal, narrow, thick walled, provided with a single series of small contiguous pores; medullary numerous, composed of one to ten superimposed cells.

HABITAT.—Jurassic formation, near Würtemberg and Waidhofen.

4. **Araucarioxylon Virginianum** Knowlton.

Fossil Wood and Lignites of the Potomac Formation, Bull. U.S. Geological Survey, No. 56, p. 50, Pl. VII, figs. 1–4.

Annual ring very indistinct, about 2mm broad; tracheïds bearing one to two rows of hexagonal pits on the radial walls, mudullary rays simple; of one to twenty-seven superimposed cells; resin ducts none.

HABITAT.—Potomac Formation, Taylorsville, Virginia.

5. **Araucarioxylon Argilliacola** Eichw. Sp.

Araucarites Argillicola Eichwald. Lethæa Rossica, Vol. II, 1865, p. 51, Pl. V, figs. 12–12*c*.

Concentric circle indistinct; tracheïds quadrate-ovate in section, small, thick-walled, provided with two, rarely three, series of angular pores; medullary rays provided with small pores.

HABITAT.—Russia.

6. **Araucarioxylon Dœringii** Conwentz.

Sobre Algunos árboles Fosiles del Rio Negro. Boletin de la Acad. Nacional d. Cienc. en Cordoba, Vol. VII, 1885, p. 448.

Concentric circles distinct, broad, the exterior zone narrower; tracheïds provided with a single series of contiguous or with two series of alternate pores; medullary rays composed sometimes of a single series of from one to sixteen superimposed cells, sometimes of two series of from five to forty cells.

HABITAT.—Rio Negro, South America. (Suboligocene.)

7. **Araucarioxylon Heerii** Beust.

Beust, Untersuch. ü. Foss. Hölzer aus Grönland. Neue Denkschriften d. allg. Schw. Gesellsch. f. d. gesammt-Naturwiss., Vol. XXIX, 1884, p. 16, Pl. I, II, III, fig. 9.

Concentric circles less distinct, 2 to 3^{mm} broad, both exterior and interior zones composed of thick-walled cells, which are rectangular, oval, or rarely hexagonal in transverse section; pores large, hexagonal, in one to two or rarely three contiguous series; medullary rays numerous, simple or compound, composed of one to eighty-two superimposed cells, of which one, rarely two or very rarely three, come opposite to a single tracheïd; resin ducts none.

HABITAT.—Stanekerdluk, Greenland.

8. **Araucarioxylon Schmidianum** Schleiden Sp.

Felix, Studien ü. Foss. Hölzer. Inaug-Diss. Univ. Leipzig; Leipzig, 1882, p. 62.
Peuce Schmidiana Schleiden, ueber d. Nat. d. Kieselhölzer; Jena, 1855, p. 36.
Cedroxylon Schmidiana Kraus in Schimp., Pal. Vég., II, p, 373.

Annual circles evident or sometimes indistinct; tracheïds provided with a single row of large contiguous pores; medullary rays two to fifty-five cells high, one to three cells broad.

HABITAT.—Tiruvicary and Pattacary, near Pondicherry, India.

9. **Araucarioxylon Robertianum** Schenk.

Engler's Bot. Jahrb., Bd. III, 1882, p. 355.

Annual rings sharply separated by the presence of two or three layers of tangentially compressed tracheïds in the fall-wood; summer-wood passing gradually into the fall-wood; walls of the tracheïds provided with one to four rows of spirally placed pores, which are irregularly compressed or hexagonal; medullary rays numerous, in a single row or in the middle, rarely in two rows of cells, which range in number from one or two to twenty-four, or rarely as many as forty-two to forty-four.

HABITAT.—Assanole, near Ranigaudsch, India.

10. **Araucarioxylon latiporosum** Kraus.

Schimp. Pal. Vég., II, p. 384.
Pinites latiporosus Cramer in Heer's Flor. Foss. Arct., Vol. I, 1868, p. 176, Pl. LX, figs. 1–8.

Annual rings distinct, 3.48 to 6.1^{mm} broad; wood-cells 1.9 to 2.7^{mm} long, 20 to 90.3 micro-millimeters thick, 46.6 to 80μ broad, provided with a single row of large contiguous pores, which have an outer average diameter of 35 by 17 micro-millimeters and an inner diameter of from 8.4 by 3 to 6 micro-millimeters; average number of pores to each wood-cell ten to thirteen, sometimes as many as forty; medullary rays composed of a single series of four to seventeen superimposed cells, the whole ray having a height of 76.5 to 379.9μ; individual cells are 15.3 to 24.5μ (average of one hundred and ninety cells 20.64μ) in diameter, 136 to 192μ (average 152μ) long, and about 20μ broad; the medullary rays are provided with numerous very large, roundish or elliptical pores, which have a breadth of 10 to 64μ and a height of 10 to 20μ.

HABITAT.—Green Harbor, Spitzbergen.

11. **Araucarioxylon Hügelianum** Kraus.

Schimp. Pal. Vég., II, p. 384.

Pinites Hügelianus Göpp. in Bronn's Gesch. d. Nat., Vol. III, pt. 2, p. 40; Monog. d. Foss. Conif., 1850, p. 214.

Concentric circles (2^{mm} broad) indistinct; tracheïds all thick walled; pores small, in a single contiguous series or separated; medullary rays numerous, simple, of two to twenty-four narrow superimposed cells.

HABITAT.—Tasmania. "Formation probably oölitic." Schimper.

12. **Araucarioxylon subtile** (Merckl.) Kraus.

Schimp. Pal. Vég., II, p. 384.

Araucarites subtilis Mercklin in Paleodendrologicon ross., 1856, p. 54, Pl. XI.

Concentric circles distinct, 5 to 7^{mm} broad; the cells thin walled; pores spirally disposed in two series, contiguous, angled, small, or in a single series, being there subrectilinear, oval and remote; internal pore very small; medullary rays numerous, in a single series of one to fifteen superimposed cells.

HABITAT.—Eastern Russia. (Siberia?)

13. **Araucarioxylon Möllhausianum** Göpp. Sp.

Araucarites Möllhausianus Göppert, in Möllhausen's Tagebuch einer Reise vom Mississippi nach den Küsten der Südsee. Leipzig, 1858, p. 492.

This species was not described by Göppert and consequently can not be identified. It is possibly the same as *Araucarioxylon Arizonicum* Knowlton (*ante* p. 614).

HABITAT.—New Mexico.

DOUBTFUL SPECIES.

Dadoxylon Sternbergii Endl.

Synops. Conif., p. 300. *Araucarites Sternbergii* Göppert, in Brown Gesch. d. Nat., III, 2, p. 41.

Araucarites Edwardianus Göpp.

See Benst Untersch. ü. foss Hölzer aus Grönland; (Neue Denkschriften, Bd. XXIX, 1884) Ubersichts Tab. I.

U. S. NATIONAL MUSEUM, *January*, 1889.

NOTES ON NORTH AMERICAN CRAYFISHES—Family ASTACIDÆ.

BY

WALTER FAXON.

The following notes are the result of an examination of the North American Astacidæ received at the U. S. National Museum and the Museum of Comparative Zoölogy and also those collected by the field parties of the U. S. Fish Commission since the publication of the first part of the author's revision of that group.* Herein are included full descriptions of all the new species discovered since the publication of that work, together with such additions as have been made to our knowledge of the distribution of these animals. The notes thus form a supplement to the Revision of the Astacidæ.

Cambarus blandingii (Harl.).

Additional localities: North River, Lexington, Virginia; Dismal Swamp, outlet of Lake Drummond, Suffolk, Virginia; Tar River, Rocky Mount, North Carolina; Neuse River, Raleigh, North Carolina. Collected by D. S. Jordan (U. S. F. C.).

Cambarus blandingii acutus (Gir.).

York, Clark County, Illinois. H. G. Hodge (U. S. N. M.).

Cambarus versutus Hag.

Additional locality: Escambia River at Flomaton, above Pensacola, Florida. D. S. Jordan, B. W. Evermann, and C. H. Bollman (M. C. Z.). A young male. The rostrum tapers a little more than in the type specimens from Mobile, Alabama, and is lightly carinate above in the median line. In these respects it agrees with the specimens from Cape Barrancas, Florida, mentioned on page 34 of my Revision of the Astacidæ.

Cambarus alleni Fax.

Caloosahatchee River, Florida. W. H. Dall (U. S. N. M.). Two males, form I, two females. In the female (now known for the first time) the chelæ are short and broad compared with those of the male.

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* A Revision of the Astacidæ. By Walter Faxon. Part I. The Genera Cambarus and Astacus. Mem. Mus. Comp. Zoöl., Vol. x, No. 4, 1885.

In an individual 78^{mm} long the chela measures 25 by 9.5^{mm}, while in a male 71^{mm} long the chela is 35 by 9^{mm}. The annulus ventralis forms a prominent tubercle. The rostrum is subdenticulate near the apex.

Cambarus evermanni, sp. nov.

Male, form I.—Rostrum broad, triangular, smooth, moderately concave above, margins raised into sharp crests which extend well back on the carapace between the post-orbital ridges; no lateral spines. Post-orbital ridges without spines. Carapace compressed laterally, fore border hardly angulated below the eye; punctate above, granulate on the sides, no lateral spine, branchiostegian spine small; distance from the cervical groove to the hind border of the carapace scarcely one-third the length of the whole carapace; areola of moderate width. Abdomen longer than the cephalothorax; two spines on each side of the hind border of the basal segment of the telson; terminal segment of the telson shorter than the basal. Anterior process of the epistoma subtruncate. Basal segment of the antennule furnished with a spine on the inner margin of the ventral surface half way between the proximal and distal extremities. Antennæ shorter than the body, spines on the second and third segments obsolescent; antennal scale broad, broadest in the middle, surpassing the rostrum and equaling the peduncle of the antenna. Third pair of maxillipeds setose within and below. Chelipeds slender; chela long, subcylindrical, squamoso-tuberculate, inner border provided with a row of about seven dentiform tubercles; fingers as long as the hand, straight, with longitudinal ribs; carpus tuberculate on the inner side, armed with one prominent spine on the inner border; meros tuberculate on the upper margin, with two rows of spines below. Third and fourth pairs of legs hooked on the third segment; hooks of both pairs simple. Fourth and fifth pairs of legs with a flattened, laminate tubercle on the basal segment, that on the fourth pair the larger. Anterior abdominal appendages of moderate length, somewhat recurved at the end, outer part terminating in a horny truncate head with a slightly developed recurved tooth, beared anteriorly on the outer side; inner part terminating in an articulated spine obliquely placed, and not exceeding the outer part of the appendage.

Length, 70^{mm}; from tip of the rostrum to the cervical groove, 22^{mm}; from the cervical groove to the posterior margin of the carapace, 10^{mm}; abdomen, 37^{mm}; cheliped, 65^{mm}; chela, 33 by 7^{mm}; width of areola in its narrowest part, 2^{mm}.

Escambia River at Flomaton, above Pensacola, Florida. D. S. Jordan, B. W. Evermann, and C. H. Bollman (M. C. Z.).

This species belongs to group I, (type, *C. blandingii*). It is nearly related to *C. alleni*.Fax. but differs in the form of the first pair of abdominal appendages (*cf.* the description of those parts in *C. alleni*, Rev. Astacidæ, p. 35), in the simple structure of the hooks of the fourth pair of legs, in the presence of a flattened tubercle on the basal segment of the fourth pair of legs, in the shorter metacarapace, broader areola, long spiny telson, etc. The male appendages are similar to those of *C. fallax* Hag., as are also the tubercles on the basal segment of the fourth and fifth pairs of legs. More specimens of the three related species *C. alleni*, *C. evermanni*, and *C. wiegmanni* are much needed in order to elucidate the structure of the female and the two forms of the male.

Cambarus barbatus Fax.

Astacus penicillatus Le Conte, Proc. Acad. Nat. Sci., Phila., VII, 1855, p. 401, (*nec* Olivier, 1791).

Cambarus penicillatus Hagen, Ill. Cat. Mus. Comp. Zoöl., No. III, 1870, p. 53. Faxon, Proc. Amer. Acad. Arts and Sci., XX, 1884, p. 138. *Id.*, Mem. Mus. Comp. Zoöl, X, No. 4, 1885, p. 36.

Additional locality: Escambia River at Flomaton, above Pensacola, Florida. D. S. Jordan, B. W. Evermann, and C. H. Bollman (M. C. Z.). One male, form I; five females, five young. The annulus ventralis of the female is divided by a deep, longitudinal furrow into two prominent tubercles, each of which is denticulate. The inner margin of the hand is serrate, but not bearded as in the male. Length, 60^{mm}. After examining these undoubted specimens of Le Conte's *Astacus penicillatus* I am confident that the second-form males and the females from Charleston, South Carolina, referred to this species by Hagen (*op. cit.*, p. 54; *cf.* Faxon, Mem. Mus. Comp. Zoöl., X, No. 4, p. 37) belong to some other species.

Following the code of nomenclature adopted by the American Ornithologists' Union* (canon XXXIII, p. 47), Le Conte's specific name *penicillatus* must be rejected, since it had been used previously by Olivier (Encyc. Méth., Hist. Nat. des Insectes, VI, 1791, p. 343), in combination with the same generic name, for another animal (*Palinurus penicillatus* of recent authors).

Cambarus pellucidus (Tellk.).

This species has been reported from the following caves in Indiana, besides the Wyandotte and Bradford Caves; caves at Clifty, Bartholomew County (Dr. John Sloan); Mayfield's Cave, near Bloomington, Monroe County (C. H. Bollman).† These caves are in the White River drainage. For further remarks on *C. pellucidus* see below under *C. setosus.*

Cambarus simulans Fax.

Additional locality: Tributary of Medicine River, Barber County, Kansas. Messrs. Williams and Cragin (M. C. Z.).

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* The Code of Nomenclature and Check-List of North American Birds adopted by the American Ornithologists' Union; being the report of the committee of the union on classification and nomenclature, New York, 1886.

† Packard, Mem. Nat. Acad. Sci., Vol. IX, No. I, p. 16.

Cambarus gracilis Bundy.

Additional localities: York, Clark County, Illinois, H. G. Hodge (U. S. N. M.); Labette County, Kansas, W. S. Newlon (M. C. Z.).

Cambarus bartonii (Fab.).

Additional localities: St. John River, just above Grand Falls, New Brunswick, W. F. Ganong (M. C. Z.); head of Kennebec River, outlet of Moosehead Lake, Maine, Edwin Faxon (M. C. Z.); Shenandoah River, Waynesborough, Virginia, D. S. Jordan (U. S. F. C.); Peak Creek, Pulaski, Virginia, D. S. Jordan (U. S. F. C.); Swannanoa River, Black Mountain, North Carolina, D. S. Jordan (U. S. F. C.); Bloomington, Indiana, W. S. Blatchley (M. C. Z.). Prof. D. S. Jordan informs me that he has found Cambarus (*C. bartonii*, doubtless,) in a tributary of the Housatonic River, Berkshire County, Massachusetts. It had been known previously in that county only from Williamstown. With reference to the distribution of *C. bartonii* in the Province of Quebec and in New Brunswick Mr. W. F. Ganong has called my attention to the fact that it was recorded by Dr. Robert Bell,* as long ago as 1859, as abundant in the Restigouche, Matapediac, and Metis Rivers. Dr. Bell also found one specimen just below the high falls of the Ouiatchouan, a stream which empties into the south side of Lake St. John in Quebec. In 1865 Prof. H. Y. Hind* mentions a Cambarus (doubtless *C. bartonii*) in the Upsalquitch, a tributary of the Restigouche. Mr. Ganong* himself has lately published a paper on the distribution of *C. bartonii* in New Brunswick, in which attention is drawn to its occurrence at many points in the St. John River and its affluents, from Grand Falls to Fredericton, and additional testimony is given as to its presence in the Restigouche and Upsalquitch. Mr. Ganong was informed that it was very abundant in the southwest Miramichi also, but he searched for it without success in the St. Croix. The northern limit of its distribution, then, so far as known, is the Ouiatchouan, Metis, and Matapediac Rivers, in the Province of Quebec, while the eastern limit is the Miramichi, New Brunswick.

Specimens of *C. bartonii* from Bloomington, Indiana, like all that I have seen from that State, are a smooth form, with very narrow areola and obsolete internal basal carpal spine.

Cambarus bartonii robustus (Gir.).

Additional locality: Wytheville, Wythe County, Virginia. Col. M. McDonald (U. S. F. C.).

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* On the Natural History of the Gulf of St. Lawrence, and the Distribution of the Mollusca of Eastern Canada. By Robert Bell, Jr., Canadian Naturalist and Geologist, IV, 1859, p. 210.

* Prelim. Rep. Geol. New Brunswick, p. 130.

* The Crayfish in New Brunswick. By W. F. Ganong. Bull. Nat. Hist. Soc. New Brunswick, No. VI, pp. 74, 75, 1887. See also The Crayfish in the Atlantic Provinces. [By W. F. Ganong.] The Educational Review, III, 95, St. John, N. B., Nov. 1, 1889.

Cambarus longulus Gir.

Cambarus longulus Girard, Proc. Acad. Nat. Sci. Phila., VI, 1852, p. 90.

Cambarus bartonii (part.) ? Hagen, Mon. N. A. Astacidæ, pp. 78, 79, 1870. Faxon, Proc. Amer. Acad. Arts and Sci., XX, 1884, p. 143. *Id.*, Rev. Astacidæ, pt. I, p. 66, 1885.

Waynesborough, Virginia; Lick Run, James River, Virginia; North River, Lexington, Virginia; Wytheville, Virginia; South Fork of Holston River, near Marion, Virginia; Spring Creek, Hot Springs, North Carolina; Watauga River, Elizabethton, Tennessee. Col. M. McDonald and Prof. D. S. Jordan (U. S. F. C.). Specimens in the Museum of Comparative Zoölogy from Bath County, Virginia, from near White Sulphur Springs, West Virginia, and from Knoxville, Tennessee, probably belong to this species, but they are too young to determine with certainty.

It is only after examining the large number of specimens (over one hundred, including females and both forms of the male), collected by Colonel McDonald and Professor Jordan, that I am prepared to restore this form to the full rank of a species. When the Monograph of the North American Astacidæ was written, Dr. Hagen had seen but one specimen (Girard's type), and he inclined to regard it as a deformed individual of *C. bartonii*. His description of the type specimen shows that it is the same as the form now under consideration. Compared with the typical *C. bartonii* from eastern Pennsylvania, the rostrum of *C. longulus* is much longer and narrower, deeply excavated above, the sides thickened, somewhat concave and convergent, with longer acumen; the antennæ scale is produced into a longer spine; the carapace is more finely punctated, the hepatic and branchial areas smoother, the suborbital angle commonly but little or not at all developed; the chelæ are smoother and broader; the fingers more cylindrical, without the longitudinal ridge along the upper face of the outer finger, widely separated at the base, the outer one bearded within at the base and along the margin; the basal spine of the inner margin of the carpus is absent. The beard on the hand is densest in small specimens, being more or less removed by attrition in old individuals. In specimens from Marion, Virginia, Spring Creek, North Carolina, and Elizabethton, Tennessee, the suborbital angle is prominent, as in *C. bartonii*. In *C. bartonii longirostris* Fax. (Rev. Astacidæ, p. 64), the rostrum is not so much contracted, its margins not so much thickened as in *C. longulus*, in fact the rostrum of *spinirostris* has about the same shape as that of *C. bartonii robustus;* the sides of the antennal scale are straight and nearly parallel to one another; the fingers are not separated more than in the typical *C. bartonii* and not so densely bearded as in *C. longulus*. It connects with the typical *bartonii* through *robustus*. But I have hardly enough material before me to give *spinirostris* a firm place as a subspecies.

Girard did not know whence his type of *C. longulus* came. As far as known it is found in the elevated parts of Virginia, West Virginia, western North Carolina, and eastern Tennessee, drained by the Shenandoah, James, Kanawha, and Holston river-systems. It is thus found on both sides of the Appalachian water-shed.

Cambarus bartonii and *C. longulus* are both found in Reed Creek at Wytheville, Virginia, with no indication of the two forms interbreeding. But it is not on this account that I consider them two species. I have reason to believe that oftentimes in this genus mere varieties, coming into contact in a given locality, are perpetuated by breeding true, when, by extending our geographical range, every intermediate condition connecting the two forms will be found still surviving. Nowhere do we seem to come so near to seeing the process of evolution of species going on under our very eyes as in this genus *Cambarus*. It seems to me that the only criteria of a species must be the amount and character of the variation, and the absence of intermediate forms not in one locality alone but over the whole area of distribution.

Cambarus acuminatus Fax.

Additional localities: Swannanoa River, Black Mountain, North Carolina; James River, Morgantown, North Carolina; Neuse River, Raleigh, North Carolina; Reedy Fork, Cape Fear River, Greensborough, North Carolina. D. S. Jordan (U. S. F. C.).

The specimen (a female) from Morgantown agrees with the type of *C. acuminatus* from the Saluda River, South Carolina, in the lack of a suborbital spine. In the others this spine is present as in the North Carolinian specimens mentioned on page 68 of the Revision of the Astacidæ.

Cambarus dubius Fax.

Additional locality: "Among the Cherokees," Indian Territory. One male, form I. James Mooney (U. S. N. M.).

This species was previously known only from the remote Appalachian Mountain region of Virginia and West Virginia. According to the label accompanying the specimen it is called *Tsisgágili* (red crayfish) by the Cherokee Indians.

Cambarus diogenes Gir.

Additional localities: Prince William County, Virginia, Dr. H. C. Yarrow; Kankakee River, Riverside, Indiana, C. H. Gilbert; Kokomo, Indiana, A. W. Moore (U. S. N. M.).

Cambarus argillicola Fax.

Additional locality: Lowlands bordering on Wabash River, York, Clark County, Illinois. H. G. Hodge (U. S. N. M.).

According to the manuscript label accompanying these specimens, they were found in burrows from 18 inches to 2 feet in depth, containing from 6 inches to 1 foot of water. At the mouth of these burrows were mud chimneys 5 inches high. The soil was blue clay mixed with sand and gravel. At least three species build chimneys, viz: *C. diogenes*, *C. argillicola*, and *C. dubius*.

The specimen from Kelley's Island, Lake Erie, Ohio, inadvertently referred to *C. diogenes* in my Revision, p. 71, is *C. argillicola*. I have not yet seen *C. diogenes* from the State of Ohio.

Cambarus setosus Fax.

Cambarus setosus Faxon, Bull. Mus. Comp. Zöol., XVII, No. 6, 1889, p. 237, pl. I, figs. 1, 2,3, 7, pl. II, fig. 1.

Rostrum rather short, triangular, slightly concave above, terminating in a short, upturned horny tip; sides convex, raised into sharp crests; no lateral teeth except in small specimens which show a rudimentary spiny tooth on each side of the base of the acumen; margins setiferous. Post-orbital ridges obsolescent, destitute of spines. Carapace subcylindrical, flattened above, the region behind the cervical groove very long; smooth and punctate above, granulate on the hepatic and branchial areas; a small spine on the antero-lateral border, a little way above the anterior end of the cervical groove. Areola very narrow, sides subparallel for some distance. Abdomen longer than the cephalothorax, sparsely setose; pleura rounded; telson of moderate length, proximal segment bispinose (occasionally trispinose) on each side. Anterior process of the epistoma broadly transverse, anterior border notched or dentate. Sternum tuberculate between the first to third pairs of legs. Eyes and eye-stalks rudimentary, but not wholly covered by the rostrum. Basal segment of the antennule furnished with a sharp spine below, near the distal end. Antennæ as long as, or longer than, the body; antennal scale surpassing the rostrum, very broad, the broadest part near the distal end; outer margin setose, convex, inflated, ending in a sharp but not very long spine. Third maxillipeds hirsute. Chelipeds of moderate length; chela long, setose, inner and outer margins of the hand provided with blunt tubercles irregularly disposed in a double row; fingers, long, incurved, opposed edges straight, bluntly toothed near the base, finely pectinate throughout their length, tips curved, corneous and acute. Carpus armed with a prominent internal median and inferior median spine; in addition to these there are in older specimens a variable number of small spines on the inner, lower, and outer faces. Upper margin of the meros spinulose, lower face with the usual biserial arrangement of spines.

In the male the third pair of legs is hooked on the third segment. The first abdominal appendages are similar to those of *C. bartonii*, ending in two recurved hooks, the outer of which is corneous and acute in in form I, the inner long, slender, and membranaceous. In form II both hooks are membranaceous, short, blunt, and not so widely separated as in form I.

In the female the annulus ventralis is very protuberant, especially the posterior border, and subcircular, with a deep central cavity.

In young individuals the chela and carpus are nearly destitute of the tubercles found in full grown specimens.

Length of a female, 65^{mm}; cephalothorax 31.5^{mm}; from tip of rostrum to cervical groove, 17^{mm}; from cervical groove to posterior margin of carapace, 14.5^{mm}; chela, 28^{mm}; breadth of chela, 8^{mm}; movable finger, 18^{mm}; abdomen, 34^{mm}.

The arrangement of the olfactory setæ on the outer flagellum of the antennules is similar to that in *C. pellucidus*, *i. e.*, of the thirty segments of the flagellum, the sixteenth to the twenty-seventh bear olfactory setæ, and these setæ are long, as in the other blind species of Cambarus. The peculiar pectination of the cutting edge of the fingers I have not observed in any other species.

From Wilson's Cave and wells in Jasper County, Missouri. Miss Ruth Hoppin (M. C. Z.). Three males, form I; sixteen males, form II; fifteen females.

The drainage of Jasper County, which lies in the southwestern part of Missouri, goes to the westward and then southward by the Neosho or Grand River into the Arkansas The following account of Wilson's Cave and the wells from which this crayfish was taken, with remarks on the habits of the animal, is extracted from Miss Hoppin's letters printed in Mr. Samuel Garman's paper on the cave animals of southwestern Missouri.*

> Wilson's Cave is about 50 feet long, nearly as wide, oven-shaped, and high enough to stand erect except around the sides. The farmer had enlarged the entrance to use the place as a creamery. A small very clear stream flowed along the left side, having a width of 2 feet and a depth of 3, with a temperature of +54° F. About 10 feet from the entrance the light struck the stream in such a manner that we could see everything in the water without a lantern. The first things that caught the eye were a lot of white crayfish, a dozen in all, like those I took from the wells. It seemed as if I might take every one of them. But, though blind, they have one or more of the other senses very keenly developed. I am very sure they, as well as the white fishes [*Typhlichthys subterraneus* Gir.], have the tactile sense developed in an unusual degree. At the least touch upon the water they dart away. As the net cautiously follows, they escape adroitly, making no blunders as to the direction of the approaching enemy, and hide in crevices of the jutting rocks or in the muddy bottom of the stream. The mud was easily stirred so that nothing could be seen. These creatures, fish and crayfish, are only to be secured by patient waiting and skillful management. The people at the cave say the fish never bite, and can not be taken with hook and line. The crayfish were all found near the entrance, where there is considerable light. Following the stream back to a dark recess, reached by crawling on the slippery rocks, the light of the lantern revealed a school of little white fishes, such as I secured from the wells. All were very small. I saw half a dozen or more, but secured only one. I concluded the crayfish liked the light. Perhaps they remain near the entrance because they find there a supply of food. We found a few snails floating about, but saw none in the dark pool where the fish were.

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* Cave Animals from Southwestern Missouri. By Samuel Garman. Bull. Mus. Comp. Zoöl., vol. XVII, No. 6, 1889, pp. 225–240.

Miss Wilson, who was with me, thinks the crayfish devour the others. She has never seen them together, and says the latter keep away from the former, though she had not noticed the crayfish catching or eating them. There was nothing to prevent the crayfish ascending the stream to where the others were.

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On my first visit, the water being low, no crayfish were seen in the dark nook, the place favored by the fish. After the storm which had flooded the caves, a few were found there. Though I watched for some time, I never saw them pursue the fishes, as they might easily have done, guided by the stir in the water. Both creatures are very sensitive to the slightest ripple. During high water a pool, "the lake," is formed a little way from the stream in another dark part of this cave. In low water the pool is cut off from the creek. I found both species in it, the fish in the darkest part, and saw no signs of enmity. Most of the crayfish were found in the lower part of the stream, in the twilight; the fishes could not be found without the lantern. At the time of the floods the cave is full, and the water rushes out furiously. * * * Another proof that the crayfish are more fond of the light is seen in the shallower wells. That from which most were taken was more exposed to the sun. At noon, when the light was more favorable, we could see them swimming about. No fishes have been taken from this well. They were taken in the narrower, more shaded wells, of which the deep ones on the hills report fishes only.

As to the food of the fishes, I discovered nothing. The mud where they were was not so deep as farther down. An examination of it the length of the cave brought to light many snails; the shells of the living ones are whiter and more nearly transparent than the floating dead ones. The largest crayfish are of a dirty rusty color, and very bristly, in caves and in wells. One large one is very soft and very white; no doubt it is newly moulted.

Both fish and crayfish were less numerous after the freshet, and apparently less active. The disturbance of the flood may have caused them to retreat into their hiding places, only the weaker being left behind, or some may have been swept away by the torrent. The sensitive creatures would soon die in the light and heat outside, where the water is full of frogs and eyed-crayfishes. * * * The specimens became opaque when they are put into alcohol; they are almost transparent when alive, so much so that the action of their internal organs can be observed. Repeated tests assured me the animals were blind, though very sensitive to the sunlight. They died soon after catching, even in water frequently changed.

The wells from which specimens have been taken are about half a mile from Center Creek, the water level in wells and creeks being nearly the same. The wells were nine or ten in number, from 5 to 80 rods apart, from 11 to 30 feet in depth, deeper in the higher ground, and having a depth of water varying from 2 to 4 feet. In some wells the rock at the bottom had been excavated. The water is what is commonly called hard, *i. e.* impregnated with lime. After rains some of the wells have softer water than others, and the water stands higher in these wells, indicating closer connection with surface drainage. All of the wells soon regain the common level. They become low in times of drouth, but never dry out entirely, as is the case with a cave spring near by, about 12 feet above the level of the creek. The temperatures taken in the wells at low water ranged from +52° to 54° Fahr. During a storm in the well having the highest water, the temperature rose to +57°. When the mercury stood at 90° to 95° in the shade outside, the temperature was only 54° in Wilson's Cave.

According to Miss Hoppin, the young of *C. setosus* when alive are not so white as the older ones.

At first I attributed it to greater transparency, but now I am sure the color is in the shell, not that the internal organs can be seen because of the transparent shell. They are not so dark, however, as the brook species [*C. virilis*] of the same size.

In connection with Miss Hoppin's observations on the crepuscular habits of this species it is interesting to note that the atrophy of the visual organs has not progressed so far as in the other blind crayfishes of the United States, *C. pellucidus* and *C. hamulatus*.* In other respects, also, *C. setosus* is more closely related to outside, eyed species than is either of the other cave species. This doubtless results either from the twilight conditions under which it lives, or more probably from its having been subjected for a shorter period of time to cavern influences.

The three blind species, although belonging to two sections of the genus, resemble each other in the slenderness of the body and claws and in the width of the antennal scale. The slenderness of the body and claws in these species may be attributed to their life in caves, where competition is largely removed and physical power ceases to be an important factor in their existence. The width of the antennal scale is probably a variation correlated to the atrophy of the adjacent eye and ocular peduncle. In short, these points of resemblance between the three cave species, like the rudimentary state of the eye and the transparency of the shell, are of little value from a taxonomic point of view, not indicating close genetic affinity, but surely appearing in widely diverse species, provided they be subjected to the same subterranean life. The closer *superficial* likeness between *C. pellucidus* and *C. hamulatus*, belonging to different sections of the genus, than between *C. hamulatus* and *C. setosus* belonging to the same section, may be explained by the longer period of time during which the subterranean influences have probably been exerted upon the first two species.

G. C. Broadhead (Report of the Geological Survey of the State of Missouri, 1874, p. 36) states that blind crayfishes are found in the cave region of Christian County, near Ozark, in southern Missouri. It is probable, from the locality, that they are the same species as those from Jasper County.

Cambarus affinis (Say).

Additional localities: Shenandoah River, Waynesborough, Virginia; Blackwater River, Zuni, Virginia; Patoka River, Patoka, Indiana. D. S. Jordan (U. S. F. C.).

The specimens from Patoka, Indiana (six males, form I; four females), differ from the typical *C. affinis* as follows: The areola is broader in the middle, there is but one lateral thoracic spine, the hepatic area is smoother (merely granulate, instead of spinous), the branchiostegian

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*On the contrary, Mr. G. H. Parker concludes that the histology of the retina shows more degeneration in *C. setosus* than in *C. pellucidus*. His researches on the subject will shortly be published in the Bulletin of the Museum of Comparative Zoölogy. From the external morphology alone, one would surely be justified in deeming *C. setosus* the least modified of the three blind species. The eye-stalk and external part of the eye are largest in *C. setosus*, smallest in *C. pellucidus*. *C. hamulatus* stands between the other two in this regard. For the aberrant position of *C. pellucidus* in other respects, see my Revision of the Astacidæ, page 18.

spine is much smaller, and the hand more inflated and triangular; the cephalathorax is slenderer, the antennæ longer; the male appendages are very similar to those of the typical form, but the free tips are a little longer and slenderer. In the smoothness of the carapace and, to some extent, in the shape of the hand this form approaches *C. sloanii* Bundy, but the male organs and the annulus ventralis are very nearly like those of the typical *C. affinis.* I prefer to call it a western variety of *C. affinis.* The largest is 60^{mm} in length. The specimens from Lake Erie referred to *C. affinis* in my Revision are too small to determine with certainty.

Cambarus propinquus Gir.

Additional localities: Marshall, Michigan; St. Mary's Lake, mouth of Battle Creek, Michigan; Kalamazoo River, Michigan, C. H. Bollman (U. S. F. C.); Lafayette, Indiana, H. L. Osborn (M. C. Z.).

Cambarus neglectus Fax.

Cambarus neglectus Faxon, Bull. Washburn Coll. Lab. Nat. Hist., Topeka, Kansas, Vol. I, 1885, p. 142.

Male, form I.—Rostrum broad, slightly excavated, with a median longitudinal carina toward the apex; sides nearly parallel from the base to the lateral spines, which are very small and of a brown color; acumen of moderate length. Post-orbital ridges with very small anterior spines (sometimes none). Carapace oval, flattened above, punctate, lightly granulate on the sides, lateral spine minute or obsolete antero-lateral border angulated below the eye; anterior segment equals, at the most, twice the length of the posterior segment; areola of moderate width. Abdomen longer than the cephalothorax; basal segment of the telson bi-spinous on each side of the posterior margin. Antennæ shorter than the body; lamina as long as the rostrum, broadest toward the distal end, apical spine of moderate length. Anterior process of the epistoma long, subtruncate. Third maxillipeds hairy within, naked below. Chelipeds short; chela broad, punctate above and below, inner margin furnished with a double row of depressed tubercles; fingers of moderate length, more or less gaping at the base, with a row of round tubercles on their opposed edges, outer margin of the movable finger also furnished with low tubercles; carpus broad, punctate above, with a strong median spine on the internal side and a small one near the base, no spines on the lower side. Superior border of meros armed with two obliquely-placed anteapical spines, lower face of meros with two rows of spines. Third pair of legs hooked. First pair of abdominal appendages nearly straight, reaching forward to the first pair of legs, terminating in two long, slender, pointed, horny styles; the anterior style (outer part of the appendage) is a little longer than the posterior and slightly recurved; anterior border of the appendage carinate but not shouldered.

In the second form of the male the first abdominal appendages are cleft but a short distance. The terminal part of the appendage is stouter than in the first form, and not horny, and the tips of the rami are rather blunt.

The annulus ventralis of the female is triangular, with a deep transverse fossa bounded on all sides by a prominent wall which is bituberculate in front.

Dimensions of a male, form II: Length, 68^{mm}; cephalothorax, 32^{mm}; from end of rostrum to cervical groove, 21^{mm}; from cervical groove to posterior margin of carapace, 11^{mm}; width of areola, 2^{mm}; abdomen, 36^{mm}; chela, 25 by 10.5^{mm}.

Mill Creek, Wabaunsee County, Kansas; Republican River, near Guy, Cheyenne County, Kansas; Sappa Creek, Oberlin, Kansas. (M. C. Z.).

This is the species mentioned, but not named, in my Revision of the Astacidæ, page 94, under *C. propinquus*. When that work was written I had seen but three specimens of this crayfish, all of them second-form males, without locality. Collections sent from Kansas by Prof. F. W. Cragin supply the first form of the male and the female. In general appearance this species nearly resembles *C. propinquus*, but the fore border of the carapace is angulated under the eye, and the sexual appendages of the male are quite different, resembling those of *C. rusticus placidus*. The annulus ventralis of the female is different also.

The tips of the fingers in recent alcoholic specimens are orange colored, preceded by a dark annular band.

Cambarus virilis Hag.

Additional localities: Spencer Creek, Michigan; Barnum Lake, south of Battle Creek, Michigan; Bear Creek and Hinkson Creek, Columbia, Missouri; West Fork of Black River, Reynolds County, Missouri; tributaries of Kansas River and Ward's Creek, Shawnee County, Kansas; Wabaunsee County, Kansas; Garden City, Kansas; Sappa Creek, Oberlin, Kansas; Osage River, La Cygne, Kansas; Topeka, Kansas; Five-mile Creek, tributary of Spring River, Indian Territory (1 mile south of Kansas line, near Baxter Springs, Kansas). (U. S. N. M., M. C. Z., and U. S. F. C.)

Together with specimens of *C. setosus* from wells in Jasper County, Missouri, collected by Miss Ruth Hoppin, occur two very small specimens of a Cambarus with well developed eyes. They are too young to identify with certainty, but are probably *C. virilis* Hag. The specimens from the West Fork of Black River, Missouri, differ somewhat from the typical *C. virilis*, agreeing with those described on page 98 of my Revision of the Astacidæ, from Irondale, Missouri.

Cambarus naïs Fax.

Cambarus naïs Faxon, Bull. Washburn Coll. Lab. Nat. Hist., Topeka, Kansas, Vol. I, 1885, pp. 140, 141.

Male, form I.—Rostrum long, concave above, lateral margins converging from the base to the lateral spines, which are small but distinct; acumen of moderate length, acute. Post-orbital ridges provided with a minute anterior spine. Carapace smooth and lightly punctate above, granulate on the sides; lateral spine small, acute; cervical groove sinuate, ending anteriorly in a small branchiostegian spine; suborbital angle not prominent; areola very narrow, punctate, the margins parallel from the anterior to the posterior triangular fields; the length of the areola is equal to one-half the distance from the tip of the rostrum to the cervical groove. Abdomen as long as the cephalothorax. Proximal segment of the telson bispinose on each side, distal segment shorter than the proximal. Antennæ longer than the body; laminæ a little longer than the rostrum, broad, broadest at the middle, subtruncate at the end, with an external apical spine. Third maxillipeds densely setose within and below. Anterior process of the epistoma with very convex sides. Chela broad, flattened above, punctate, external border marginate; inner margin of the hand short, with a double row of dentiform tubercles; fingers long, movable one tuberculate on the external border, toothed on the internal border; external finger flat above, internal margin toothed, and bearded at the base. Carpus armed with a row of small tubercles on the upper side, with a strong and acute internal median spine and a small one at the base; on the lower side the carpus is provided with a prominent median spine and an external one at the point of articulation with the chela; in some specimens there is a small spine on the lower face of the carpus, between the median spine and the large one on the internal margin. Third pair of legs armed with a hooked tubercle on the inner margin of the third segment. First pair of abdominal appendages of moderate length, twisted, deeply bifid, very broad in the middle; rami slender, styliform, strongly recurved, the inner one a little shorter and more curved than the outer one, the outer one corneous. Length, 57^{mm}; cephalothorax, 27^{mm}; from tip of rostrum to cervical groove, 18^{mm}; from cervical groove to posterior border of carapace, 9^{mm}; abdomen, 30^{mm}; chela, 24^{mm}; width of chela, 10^{mm}.

The second form of the male differs from the first form in having smaller chelæ, the tubercles on the third pair of legs less developed, the first abdominal appendages less deeply cleft, the rami stouter, blunter, and not corneous.

In the female the chela is similar to that of the second form of the male, the sternum between the fourth pair of legs is smooth, the annulus ventralis triangular with a median longitudinal fissure.

Labette County, Kansas. W. S. Newlon (M. C. Z.). Five males, form I; five males, form II; seven females.

This species much resembles *C. virilis*, especially the form called *variety A* by Dr. Hagen. It differs in the shape of the first abdominal appendages of the male. In *C. naïs* the rami of these appendages are shorter and more strongly curved than in *C. virilis*, but not so much curved as in *C. immunis*. The areola is narrower than in *C. virilis*. The first abdominal appendages are very like those of *C. palmeri* Fax., as far as can be seen by a comparison of the second-form males alone; but the areola is not obliterated in any part of its course in *C. naïs* and the rostrum is more tapering than in *C. palmeri*.

Cambarus immunis Hag.

Additional localities: Wabash River, New Harmony, Indiana, D. S. Jordan (U. S. F. C.); Lafayette, Indiana, H. L. Osborn (M. C. Z.).

Cambarus immunis spinirostris Fax.

Additional locality: Ward's Creek, Shawnee County, Kansas. F. W. Cragin and J. B. Fields (M. C. Z.).

When I described this variety in 1884, I had not seen the first form of the male, which is included among the specimens collected by Messrs. Cragin and Fields. The lateral spines of the rostrum are distinct, as in the second-form male and in the female; the setæ on the second pair of legs are well developed; the first abdominal appendages are shaped exactly as in the first form male of the typical *C. immunis*.

Cambarus rusticus Gir.

Additional localities: Maramee River, Dent County, Missouri, R. E. Call (M. C. Z.); Harpeth River, Franklin, Tennessee, Gilbert and Swan (U. S. N. M.); Osage River, La Cygne, Kansas (M. C. Z.). All these are similar to the form *placidus* Hag.

Cambarus spinosus Bundy.

Additional locality: Tar River Rocky Mount, North Carolina. D. S. Jordan (U. S. F. C.).

Cambarus hylas, sp. nov.

Male, form II.—Rostrum broad, excavated, margins thickened, somewhat convergent from the base to the acute lateral spines; acumen of moderate length. Post-orbital ridges ending anteriorly in an acute spine; carapace punctate, with a small lateral and a branchiostegian spine; antero-lateral margin notched but not furnished with a suborbital spine; posterior segment equal in length to half the distance from the end of the rostrum to the cervical groove; areola of moderate width, punctate. Abdomen longer than the cephalothorax; basal segment of the telson bispinous on each side of the posterior border.

Anterior process of the epistoma triangular, the apex truncated or even notched. Antennæ shorter than the body; scale broad, broadest near the tip. Chelipeds stout, chela broad, punctate, external margin convex, internal margin furnished with a double row of tubercles; fingers slightly gaping, costate, with longitudinal rows of ciliated dots; external margin of movable finger with a line of ciliated tubercles; tips of fingers incurved, corneous. Carpus smooth, furnished with a well developed internal median and small proximal and distal internal spines; beneath, the carpus has a well developed median anterior spine, and a very minute external spine at the point of articulation with the chela. Meros furnished with two obliquely placed ante-apical spines; of the biserial inferior spines the outer row is represented by the two distal ones only. Third pair of legs hooked. First pair of abdominal appendages very long, reaching the base of the chelipeds, tuberculate on inner border near the base, bifid, anterior border carinate, rami straight, thick; the outer branch much longer than the inner, the tip slightly recurved, the inner branch blunt at the tip, and bent a little outward and backward. Dimensions: length 60^{mm}; carapace, 29^{mm}; from end of rostrum to cervical groove, 18.5^{mm}; from cervical groove to posterior margin of carapace, 9.5^{mm}; breadth of rostrum at base, 3.5^{mm}; between lateral spines, 2.5^{mm}; breadth of areola, 2^{mm}; abdomen, 31^{mm}; chela, 23^{mm}; breadth of chela, 10^{mm}; movable finger, 13.5^{mm}.

Female: Chela smaller, fingers not gaping, external finger slightly bearded at the base within. Sternum between the fourth pair of legs not tuberculate. Annulus ventralis large, triangular, the anterior margin obsolescent, posterior margin very prominent, projecting backward; fossa transverse, deep, with a sigmoid sulcus.

West Fork of Black River, Reynolds County, Missouri, R. E. Call (M. C. Z.). Four males, form II; two females.

This species is closely related to *C. putnami* Fax., but the sides of the rostrum are more thickened and more convergent from the base to the lateral spines; the antennal scale is widest near the tip (in *C. putnami* it is widest in the middle); the carpus has a well developed anterior spine, and the annulus ventralis is very different. From *C. spinosus* Bundy, it differs in its longer metacarapace, shape of the rostrum, annulus ventralis, etc.

Cambarus forceps Fax.

Additional locality: Middle Fork of Holston River, Glade Spring, Virginia. D. S. Jordan (U. S. F. C.). Four males, form I; four females. The specimen from Knoxville, Tennessee, mentioned on page 121 of the Revision, surely belongs to this species.

Cambarus montezumæ Saus.

Additional locality: Guanajuato, Mexico. A. Dugés (U. S. N. M.). *C. montezumæ* is a variable species. In the specimens from Guanajuato the rostrum is even flatter than in the typical form, tapering, and furnished with minute ante-apical teeth.

Astacus klamathensis Stimps.

Additional localities: Sprague and Williamson's Rivers, near Fort Klamath, Oregon. Dr. J. C. Merrill, U. S. Army (U. S. N. M.). Eel River, Humboldt County, California. *Teste* W. N. Lockington.* A small specimen, 37^{mm} long, collected by Dr. Merrill in Klamath Lake, Oregon, is labeled "Color in life, bluish green." An adult collected by the same gentleman is accompanied by the following note: "Color when fresh, bright red, lighter beneath; large claws darker. Common."

Astacus nigrescens Stimps.

"This species appears to be found in most of the larger brooks of the central counties of California, such as the Alameda Creek, Alameda County; Coyote Creek, Santa Clara County, and San Joaquin Slough." Lockington, *l. c.*

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* Remarks upon the Thalassinidea and Astacidea of the Pacific coast of North America, with description of a New Species. By W. N. Lockington. Ann. Mag. Nat. Hist., 5th series, Vol. II, 1878, p. 303.

MUSEUM OF COMPARATIVE ZOÖLOGY,
Cambridge, Massachusetts, January 1. 1890.

DESCRIPTION OF TWO NEW SPECIES OF BATS—NYCTINOMUS EUROPS AND N. ORTHOTIS.[*]

BY

HARRISON ALLEN.

The genus *Nyctinomus* includes twenty-one species and is of cosmopolitan distribution. Thus ten species are found in Africa and Madagascar; one in Europe, with a range in the northern part of Africa; two in India; two in the Malay Archipelago, one each in Polynesia and Australia, and four in America. It is interesting to contrast this wide range with that of the other two genera of the group in which *Nyctinomus* is found, namely, *Cheiromeles*, which is restricted to the Indo-Malayan subregion, and *Molossus*, which is confined to tropical and subtropical America, excluding the United States. Notwithstanding the extended range of *Nyctinomus*, the species are closely related. With the exception of *N. johonensis* and *N. australis*, few specialized structures are met with; and but two species—one from Madagascar (*N. albiventer*) and a second from Africa (*N. acetabulosus*)—depart from a single formula for the teeth. As is the case with the Cheiroptera generally, the American species are the most obscure. Of the four described species I have seen *N. brasiliensis*, *N. macrotis* and *N. gracilis*. A recent study of the materials at hand has led me to record descriptions of two new species.

Nyctinomus europs sp. nov.

Muzzle divided in middle into two parts by a vertical linear groove, the sides of which are defined by spines. These are continuous with the spines of the upper border of the muzzle. Ears united over the face for a distance of 2^{mm}. The outer border of the auricle not scalloped on the line of the external basal ridge, but is uniformly rounded. The revolute margin reaches as far as the anterior border of this ridge. The inner border of the auricle retains six small marginal spines. The tragus is small-pointed or obscurely notched on the summit, and is but one-half millimeter high. The antitragus, as wide as high, much narrower above than at base; the notch posterior to it is well-defined and reaches half way to the base. The external basal ridge is rudimental.

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[*] Read before the American Philosophical Society, October 4, 1889, and printed in Proc. Amer. Phil. Soc., Vol. XXVI, December 3, 1889. It is here reprinted as a paper based upon a study of the collections of the National Museum.

The keel is not highly developed and measures 7^{mm} in length. The first and fifth toes are thicker than in *N. brasiliensis.*

The tip of the third phalanx of the fourth finger is without projecting lobe.

The lips and adjacent surfaces are more tumid than in *N. brasiliensis.* The postmental wart is especially conspicuous as compared to the same structure in that species. As in *N. brasiliensis*, a median ridge lies between the wart and the lower lip.

Measurements of head and ears.

	Millimeters.
Distance from interauricular membrane to end of muzzle	3
Height of auricle	13
Distance of auricle to angle of mouth	2
Width and height of antitragus	3

In the entopatagium* the intercosto-humeral nerve divides into two terminal branches at the upper third of the wing membrane before reaching the elbow.

Four oblique lines in the positions of the intercostal nerves can be discerned.

The mesopatagium with the internal cutaneous nerves much the same as in *N. brasiliensis ;* but the superior branches are much less numerous than in that species. The distal end of the second phalanx of the fifth finger is spatulate.

The nerves on the interspaces the same as in *N. brasiliensis.* . First oblique band at radio-carpal angle attached at side of palmar surface of the muscle-mass of the fifth metacarpal bone and passes downward and inward at an angle to the radius for a distance of 4^{mm}. The pouch is conspicuous.

The tendon of the palmar interosseous muscle extends from the middle of the fifth metacarpal bone to the distal end of the first phalanx.

Fur on the back of a delicate fawn inclining to brown at the shoulders. The back of the neck and head of a lighter shade. Back of the ear the hair is almost white and covers the posterior surface to a point just beyond the line answering to the keel. The fur of the venter is of a uniform light-brown hue, verging to white. The wing membranes and tail membrane are of a brown color and are naked, excepting along a line continuous on the dorsum from the shoulder to the middle of the thigh. A delicate line of fur extends from the upper third of the arm to the middle of the thigh. The fur of the trunk, both at the shoulder and thigh, is continuous with this line, but on the entopatagium the hair is absent alongside of the body.

On the venter the foot and the distal third of the tibia are the only parts seen of the lower extremity, the remaining parts are concealed by a fold of skin which extends from the pubis to the lower third of the tibia.

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* For explanation of the terms entopatagium and mesopatagium see Proc. Acad. of Nat. Sci., Philadelphia, 1889, p. 314.

The tail membrance with distinct pelvo-tibial line, but without the line from knee which is seen in *N. braseliensis.* The free margin of the membrane is without the lobe which is so well defined in the species last named.

The Cranium.—The superior angle of the occiput is more acute than in *N. brasiliensis* and smaller by one-half. The temporal crest is distinct throughout its entire length. In *N. brasiliensis* it is absent except at the anterior half. The dorsum of the face is without the groove so characteristic of *N. brasiliensis.* The anterior nasal aperture is ovate, not cordate, as in the species last named. The lachrymal process is conspicuous and trenchant. The zygomata are of uniform width. The mentum is recedent, the posterior border being on a line which extends between the second premolar and the first molar. The coronoid process is scarcely higher than condyloid; the angular process projects well back of the condyloid.

Measurements of cranium.

Dimensions.	*N. europs.*	*N. brasiliensis.*
	mm.	*mm.*
Length	16	17
Width between zygomata posteriorly	9	10
Width of cranium at narrowest part	3	4
Distance from anterior edge second premolar to end of face	2½	1½

The Teeth.—Inc. $\frac{1-1}{2-2}$, c. $\frac{1-1}{1-1}$, pm. $\frac{2-2}{2-2}$, m. $\frac{3-3}{3-3}$.

Upper incisors near together their entire length. Interval between them much less than in *N. brasiliensis.* First premolar lies to outer side of the postero-basal cingule of the canine, which also touches the second molar. In *N. brasiliensis* the first premolar is in line with the cingule. This distinction is associated with a shortening of the axis of the face, from the center of the incisorial space to the first premolar.

Lower incisors equal, bilobed, not crowded.

Measurements of body.

Dimensions.	Millimeters.	Millimeters.	Millimeters.
Length of head and body	53		
Length of tail in membrane	17		
Length of tail free	19		
Length of forearm	40		
Length of first finger, including metacarpal	8		
Length of second metacarpal	39		
Length of third metacarpal	40	*19	†15
Length of fourth metacarpal	40	*15	†3
Length of fifth metacarpal	23	*13	†3
Length of tibia	11		
Length of foot	7		

* First phalanx. † Second phalanx.

The description is based upon examination of twenty adult specimens, all females.

N. europs resembles *N. megalotis*[*] in the shape of ears and color of fur. It differs in the shape of the antitragus. *N. megalotis* is a larger form, the length of the body and head being 75^{mm} (3″), and that of the forearm 56^{mm} (2.35″), yet the length of the second phalanx of the fourth finger is less than 1^{mm} (0″.1). This phalanx in *N. europs* measures 3^{mm}.

HABITAT.—Brazil. Collected by Professor Harte.

Prof. B. G. Wilder has kindly permitted me to study the Cheiroptera in the museum of Cornell University. The species above named were secured from this collection, where the type specimens remain.

Nyctinomus orthotis sp. nov.

The upper margin of the muzzle is below the plane of the dorsum of the face. The vertical ridge between the nostrils seen in *N. europs* and *N. brasiliensis* is absent. The nostrils are elliptical, slightly expanded above and look directly forward. The entire region of the muzzle abruptly cut off, and of quite peculiar physiognomy. There is no concavity in front of the ears. The upper border of the muzzle is not projecting and without pectinate spines, but furnished with papillæ, which tend over the nostrils. The ears are erect, large, extending 4^{mm} in advance of the muzzle, and are united on the dorsum of the face by a band 3^{mm} high.

The general form of each ear is rounded and stands out from the head as in *N. brasiliensis*. No spines occur on the upper border. The outer border is furnished with a lap or hem of skin, which measures one-fifth of the diameter of the ear conch. It is slightly scalloped in the middle and extends as far forward as the end of the external basal ridge. The keel does not reach the antitragus; it is thickened and not revolute. The anterior basal ridge forms a distinct projection at the notch. The notch extends to the base of the antitragus. The antitragus is thin, broader than high, and slightly higher posteriorly than anteriorly. A skin fold extends from the antitragus to the angle of the mouth. The tragus is quadrate and bears a general resemblance to that in *N. brasiliensis*. The sides of the face are without folds.

The fur on the dorsum is fawn color with paler tints at the base. It extends half way up the ears. On the dorsum the proximal half of the arm, the entopatagium near the body, and the basal fourth of the tail are covered with hair. On the venter the color is the same as on the back, except on the face and ears, where it is of a dark chestnut. The venter, the arm, the thigh, and entopatagium half way to the elbow are covered with a thin layer of fur. The face is occupied by a number of stout bristles between the ears and the muzzle. Two hairs, 1^{mm} long, project from the mental wart.

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[*] Dobson, Cat. Cheiropt., Br. Mus., 1878, p. 434.

The following notes have been made on the terminal digits. That of the third digit of the third finger is little over 5^{mm} in length, is slightly curved toward the trunk at the tip. A thin membrane is seen at the distal half at the thumb side. The wing membrane extends to the tip toward the trunk.

The terminal digit of the fourth finger is 3^{mm} long. The membrane is not attached to the somad surface; while on the pollicad surface it is attached the entire length of the digit. The phalanx is markedly deflected on the free margin of the membrane and ends in a free lobe.

The terminal phalanx of the fifth finger is slightly curved somad. It is 3^{mm} long and nearly 1^{mm} wide at base. The membrane is attached to the second phalanx at the middle of the pollicad margin, but reaches to the tip of the phalanx on the somad side.

No entopatagial lines are seen. The internal cutaneous line exhibits a superior branch. The nerve ends abruptly by inferior vertical branches as in *N. brasiliensis.* A line is seen on the interfemoral membrane extending from the middle of the thigh to the free margin of the membrane.

Cranium.—The cranium is of the type *N. macrotis.* The facial region is high, the nasal bones at the anterior nasal aperture being the highest point of the vertex. The upper border of the aperture is defined by a transverse line, which forms a right angle with the lateral border. A line drawn downward from the border intersects the infraorbital foramen at its posterior limit. The zygoma is without elevation. The ethmoidal swelling (by which term is meant the swelling in the orbitotemporal fossa of the frontal bone over the ethmoid), is rounded. The palatal rugæ opposite the molars abruptly angulated, the angle being forwards.

In contrast to the above, the skull of *N. macrotis* presents the following: The facial region at the anterior nasal aperture is the lowest part of the vertex. The upper border of the aperture is Λ-shaped. A line produced downward lies in front of the infraorbital foramen. The zygoma with posterior elevation. The ethmoidal swelling is ridge-like. The palatal rugæ opposite molars not angulated, but slightly curved, the curve being forwards.

Dental formula the same as in the preceding species.

The first maxillary premolar in *N. orthotis* is in the outer angle between the second premolar and the canine. It is smaller than in *N. macrotis.* The postero-internal cusp of the first and second maxillary molars continuous with a single crescentic cingulum. The cingulum of the third molar of the same series of a single crescentic form. Mandibular incisors four. The first mandibular premolar touches canine.

In *N. macrotis* the first maxillary premolar is in dental arch, *i. e.*, is neither in outer or inner angle formed by the crowding of the canine tooth and the first premolar, but is in the axis of the dental series. The postero-internal cusp of the first and second maxillary molars separate from the double crescent form of the cingulum. The cingulum of the third molar of the same series of a double crescentic form.

Measurements.

Dimensions.	Millimeters.	Millimeters.	Millimeters.
Length of head and body	68		
Height of ear	20		
Length of forearm	57		
Length of thumb	5		
Length of second metacarpal bone	22		
Length of third metacarpal bone	25	*10	†9
Length of fourth metacarpal bone	24	*10	†4
Length of fifth metacarpal bone	12	*9	†3
Length of tibia	20		
Length of foot	7		
Length of tail in membrane	25		
Length of tail free	9		

* First phalanx.

† Second phalanx.

HABITAT.—Jamaica. The single specimen is a skin in the collection of the National Museum (No. 9397, W. T. March), and was received from Spanishtown.

I have been minute in the description of these new forms for the reason that diagnoses of species have hitherto been too general. Some of the characters, such as the shapes of the terminal phalanges, the patterns of the wing membranes, the depth of the notch in the auricle and the point of termination of the auricular flange or hem have not been used in studying Cheiroptera. Even if the attempt to establish new characters should fail, it is of interest to record these novel details of structure.

SCIENTIFIC RESULTS OF EXPLORATIONS BY THE U. S. FISH COMMISSION STEAMER ALBATROSS.

[Published by permission of Hon. MARSHALL McDONALD, Commissioner of Fisheries.]

No. VIII.—DESCRIPTION OF A NEW COTTOID FISH FROM BRITISH COLUMBIA.*

BY
TARLETON H. BEAN,
Ichthyologist, U. S. Fish Commission.

On the 27th of September, 1888, the U. S. Fish Commission steamer *Albatross* obtained in Barclay Sound, British Columbia, a remarkable little fish whose affinities are with the *Cottidæ*, but differing from all the other members of the family in characters of such importance as to necessitate the formation of a new subfamily to receive it. The description is given herewith.

Subfamily SYNCHIRINÆ.

Cottidæ with ventral fins thoracic, but remote from the gill-opening and consisting of a rudimentary spine and several rays; with a short and well-developed spinous dorsal, which is separated by a deep notch from the soft portion; the spines slender; the branchial apertures wide and the gill-membrane free from the isthmus; gills 3½, apparently with no slit behind the last; the pectoral fins continuous around the breast, the rays supported all around by actinosts; the genital papilla of males capable of being received into a pit in front of the anal fin.

Synchirus gen. nov.

Body slender and moderately elongate, resembling that of *Triglops;* covered with thin, tough skin. Lateral line armed with spiny tubercles. Spiny scales in a series along the dorsal base. Head subconical, with moderately pointed snout. Mouth small, very slightly oblique; the rami of the mandible a little concave beneath. Premaxillaries protractile. Jaws with slender, villiform teeth in bands. Teeth on vomer and palatines. Pseudo-branchiæ present. Gills 3½, no slit behind the last. Gill-openings wide, extending above the median line, the membrane free from the isthmus. Suborbital connected by a bony stay with the preopercle, which bears a strong bifid spine at its angle. Pectorals completely united around the breast, all the rays supported by actinosts, the membrane free at its margin. Ventrals distant from the gill-opening, the pubic bones being remarkably long, the fins diverging widely and consisting of a rudimentary spine and three rays. Dorsal long, the spinous portion low, with slender spines, and the soft portion twice as long as the spinous. Anal long. Caudal moderately elongate, its middle rays somewhat produced.

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*Advance sheets of this paper were issued March 4, 1890.

Synchirus gilli sp. nov.

B. VI; D. VIII-IX, 19-21; A. 20; V. I, 3; P. 22.

U. S. National Museum number 41820.

The eye is about as long as the snout and one-fourth the length of the head, which is two-sevenths of the total length to caudal base. The depth is contained 5½ times in the total length. The maxilla extends to about below the middle of the eye. The interorbital space is not equal to the length of the eye. There is a pair of strong nasal spines. The preopercle has a short and very sharp bifid spine. The lateral line contains about 41 spiny tubercles and most of the specimens have a single series of spiny scales along the dorsal base. The pectorals are nearly as long as the head and extend to about below the fourth ray of the soft dorsal. The ventrals are nearly under the middle of the pectorals and their length varies greatly. In some specimens they are scarcely half as long as the head; in others they are as long as the post-orbital part of the head. In some males the anal papilla is two-thirds as long as the ventral fin of the same individual. This papilla can be received into a pit in front of the anal fin.

The spinous dorsal begins over the axil of the pectoral; the length of its base is a little greater than the post-orbital part of the head. None of its spines are much longer than the eye.

The distance of the anal origin from the head is about two-thirds the length of the head. The rays of the soft dorsal and the anal are not much longer than the dorsal spines.

The caudal is about two-thirds as long as the head and its middle rays are somewhat the longest.

The color in spirits is a pale yellowish brown. The sides show traces of several small pale blotches and the caudal and pectoral have a few very small dark blotches, those on the caudal forming interrupted bands. Across the back are faint indications of about five pale cross-bands.

The species is dedicated to Dr. Theodore Gill in appreciation of his researches upon the mail-cheeked fishes.

Three individuals, number 41820, have been taken as the types of the species. The largest is 46 and the smallest 38 millimeters in length.

DESCRIPTION OF A NEW LIZARD FROM LOWER CALIFORNIA.

BY
LEONHARD STEJNEGER,
Curator of the Department of Reptiles and Batrachians.

Cnemidophorus labialis sp. nov.

Diagnosis.—Nasal in contact with second supralabial; postnasal and first supralabial not in contact; two large preanals, the largest behind; dorsal scales equal; nostril anterior to nasal suture; eight longitudinal rows of ventral plates; femoral pores twelve to thirteen; fronto-parietals distinct; supraoculars four; caudal scales slightly oblique.

HABITAT.—Cerros Island, Lower California.

Type, U. S. National Museum, No. 15596; L. Belding, coll.

Description of type specimen.—Nostril anterior to nasal suture; three parietals; four supraoculars; seven supraciliares; a freno-orbital; two fronto-parietals; scales on middle of eyelid slightly enlarged, hexagonal; nasal in contact with second upper labial, postnasal and second upper labial being separated; posterior gular scales small, abruptly separated from the anterior, the line of demarkation between them being emphasized by the two rows nearest the latter being markedly smaller than the rest of the posterior ones; plates of the collar rather large, in several rows, the marginal largest; dorsal granules smooth, rather large; ventral plates in eight longitudinal and thirty-one transverse rows. Two large preanals, wider than high, the posterior plate being widest. Three rows of brachials of nearly the same size; antebrachials continuous with brachials, in two rows, the outer one hardly larger; granules along posterior edge of under side of forearm but slightly enlarged. Five rows of femorals, outer largest; tibials in three rows, outer largest. Upper and lateral caudal scales slightly oblique, rather strongly keeled, and pointed posteriorly. Color above dark brown, with six longitudinal light lines and a median clay-colored band of the same shade as the top of the head; two light longitudinal lines on four limbs and three on hind limbs; under side whitish, more or less suffused with bluish, especially on the flanks.

For dimensions, see table below.

In addition to the type, there are four other specimens which agree with it in all essential points; two of them have thirteen femoral pores, while two have only twelve; two have thirty-three rows of ventrals, one has thirty-one, and one thirty; three have three antebrachial rows, and in these the outer is by far the largest; two have only four femoral rows. In other respects the specimens are nearly identical.

Of all our North American *Cnemidophori* this seems to be the most distinct species, *Cnemidophorus* (*Verticaria*) *hyperythrus* not even excepted. As will be seen from an enumeration of the characters by which it differs from them all, viz: the peculiar relations of the nasals and anterior labials, the arrangement of the preanals, the low number of femoral pores, twelve to thirteen, brachials in three subequal rows, femorals in only four to five rows. Of these the first-mentioned character seems even to be unique in the genus, as I have seen no mention of it in the descriptions of extralimital species, and after a careful examination of about three hundred specimens of the various North American forms I can find no approach to the condition which is so characteristic of the present species, in all five specimens of which it is equally well pronounced. The low number of femoral pores is also well worth noting, inasmuch as it entirely destroys the usefulness of one of the sections of Boulenger's key to the species (Cat. Liz. Brit. Mus., II, pp. 360 and 361), relied upon to separate the South American species, *C. ocellifer* and *multilineatus* from the other species with eight longitudinal rows of ventral plates and the nostrils opening in the nasal. The fusion of the two posterior preanals into one wide transversal plate seems to be another good character. It is true that this state of affairs is occasionally seen in specimens of *C. sexlineatus* or its numerous subspecies, but the occurrence is rare, hardly reaching 2 per cent. in the enormous series examined by me, while in the Cerros Island species it is normal since found equally well represented in all five specimens.

So well circumscribed is the new species that a special comparison with other forms seems entirely unnecessary.

Specimens examined.

U. S. Nat. Mus. No.	Collector.	Locality.	Femoral pores.	Transv. rows of ventrals.	Femoral rows.	Total length.	Snout to collar.	Width of head.	Snout to interparietal.	Width at post. corner of supraocul. reg.	Snout to fore limb.	Collar to vent.	Fore limb.	Hind limb.	Vent. to end of tail.	Remarks.
						mm	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	
15596	Belding.	Cerros Island, Lower California.	13	31	5	187	18	8	10	5.3	19.5	37	18	40	132	Type.
15597	...do	....do	13	33	5	173	17	8	9.5	5.3	18	33	18	37	123	
15598	.. do	....do	12	33	5	....	17	8	10.3	5.3	20	37	18	28	....	
15599	...do	....do	12	31	4	....	17	7.5	9.5	5.5	18	34	18	36	....	
15600	...do	....do	13	30	4	....	18	8	9	...	19	35	19	39	....	

SCIENTIFIC RESULTS OF EXPLORATIONS BY THE U. S. FISH COMMISSION STEAMER ALBATROSS.

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No. IX.—CATALOGUE OF FISHES COLLECTED AT PORT CASTRIES, ST. LUCIA, BY THE STEAMER ALBATROSS, NOVEMBER, 1888.

BY

DAVID STARR JORDAN.

In the fall and winter of 1888–'89 the steamer *Albatross* made a voyage from Norfolk, Va., around Cape Horn to San Francisco, in the interests of the U. S. Fish Commission. During this trip large collections of fishes were made. In the present paper I give an enumeration of the species found at Port Castries on the island of St. Lucia, in the West Indies. The specimens collected are in the U. S. National Museum. A partial series is in the University of Indiana.

TORPEDINIDÆ.

1. **Narcine brasiliensis.**

STOLEPHORIDÆ.

2. **Stolephorus browni** (Gmelin).
Abundant.
3. **Stolephorus perfasciatus** (Poey).

CLUPEIDÆ.

4. **Opisthonema oglinum** (Le Sueur).
5. **Harengula arcuata** (Jenyns).
6. **Harengula macrophthama** (Ranzani).

Two species of *Harengula* are abundant in this collection. These two species, and a third (*H. sardina* Poey), have been recognized by Poey and fairly well distinguished. It is probable that all the nominal species of this group in the West Indian fauna should be referred to the synonymy of these three. These may be generally recognized by the following characters:

a. Scales firm and very adherent, so that in ordinary specimens very few if any are lost. Each scale with one to four vertical striæ, well defined and more or less curved; ventral scutes about 16+12; scales on back before dorsal more or less laciniate.

b. Body deep, with the ventral outline forming an even curve from chin to vent; depth of body, 2⅘ to 3 in length to base of caudal (3⅗ to 3⅘ with caudal); head, 3⅘ in length, 1¼ to 1⅓ in depth of body; eye moderate, one-third longer than snout, 2⅔ in head; insertion of ventrals nearer tip of snout than base of caudal; dark humeral spot often obscure or wanting; usually a row of dark points extending backward from it along upper part of sides of body; caudal pale. (Specimens from Cedar Keys, Key West, Havana, and St. Lucia) .... ARCUATA.

bb. Body more elongate, the ventral outline little convex, forming a weak arch; depth of body, 3⅜ in length to base of caudal (4⅓ with caudal); head, 3⅞ in length, 1 to 1⅕ in depth of body; eye large, 1⅕ longer than snout, 2⅘ in head; insertion of ventrals nearly midway between snout and base of caudal; dark humeral spot usually evident, sometimes wanting; above this spot a narrow dark streak extends, bounding the dark color of the back; just above this a pale streak; caudal dusky; scales a little less striate than in the others. (Specimens from St. Lucia)................ MACROPHTHALMA.

aa. Scales less firm and little adherent, so that many of them are lost in ordinary museum or market specimens; each scale with about four wavy vertical striæ on its free edge; ventral scutes, 15+10; body rather elongate, the ventral outline little convex, forming a weak arch; depth of body, 3⅓ to 3⅘ in length (4⅓ with caudal); head, 3⅘ in length, 1⅒ in depth of body; eye very large, one-third longer than snout, 2¼ in head; insertion of ventrals nearly midway between snout and base of caudal; color pale; no dark humeral spot; caudal pale. (Specimens from Key West and Havana).... CLUPEOLA.

The following seems to be the synonymy of the species, most of the earlier descriptions being so loosely drawn as to be more or less uncertain. The nomenclature is therefore throughout only provisional.

HARENGULA ARCUATA.

Sardina Escamuda.

? *Clupea arcuata* Jenyns, Ichth. Voy. Beagle, 1842, 134. (Bahia Blanca).
Harengula humeralis Cuv. & Val., XX, 293, 1847. (Guadaloupe.)
Clupea humeralis Günther, VII, 422. (Bahia, Jamaica, Trinidad, Dominica, Barbadoes.)
Alosa striata Cuv. & Val., XX, 429. (Guadaloupe.)
Harengula (?) *clupeola* Poey, Enumeratio, etc. (Havana.)
Clupea clupeola Jordan, Proc. U. S. Nat. Mus., 1886, 33. (Havana.)
Harengula pensacolæ,* Goode and Bean. Proc. U. S. Nat. Mus., 1879, 152. (Pensacola.)
Clupea pensacolæ Jordan, Proc. U. S. Nat. Mus., 1884, 107. (Key West.)

HARENGULA MACROPHTHALMA.

? *Clupea macrophthalma* Ranzani, "Nov. Com. Ac. Sc. Inst. Bonon., V, 1842, 320, tab. 23" (*fide* Günther): Günther, VII, 421. (Cuba, St. Croix, Jamaica, Barbadoes.)
? *Harengula maculosa* Cuv. & Val., XX, 292, 1847. (Martinique.)
Harengula jaguana Poey, Repertorio, I, 190, 1866. (Jagua, near Cienfuegos.)

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*Specimens from Florida seem to average a little deeper in body than those from Cuba. This difference becomes, however, inappreciable on the examination of large numbers of specimens.

HARENGULA CLUPEOLA.

Sardina De Ley.

? *Harengula clupeola* Cuv. & Val., xx, 289, 1847. (Martinique.)
Harengula sardina Poey, Memorias, II, 310, 1861. (Havana.)
Clupea sardina Jordan, Proc. U. S. Nat. Mus., 1884, 106 (Key West); *ibid.*, 1886, 33 (Havana).
Harengula callolepis Goode, Proc. U. S. Nat. Mus., 1879, 152. (Bermuda.)

EXOCŒTIDÆ.

7. **Hemiramphus unifasciatus** Ranzani.

BELONIDÆ.

8. **Tylosurus raphidoma** (Ranzani).
9. **Tylosurus euryops** (Bean).

A single specimen, agreeing with the description given by Jordan and Fordice (Proc. U. S. Nat. Mus., 1886, 347).

SYNGNATHIDÆ.

10. **Siphostoma rousseau** (Kaup).

Syngnathus elucens Poey, Synopsis, 1867, 443.

A small, slender species, with the snout one-fourth longer than the rest of the head; top of head with a slight keel; rings 16 + 34 = 50. Dorsal rays 26 to 28, the fin covering $1\frac{1}{2}$ + 5 rings. Vent midway between tip of snout and twenty-third caudal segment. Head almost three times in distance from tip of snout to vent. Lateral line interrupted above the vent. Head $7\frac{1}{3}$ in length.

This specimen agrees very closely with the short account given by Kaup of a specimen sent by Alexandre Rousseau from Martinique. The *Syngnathus elucens* of Poey seems to be the same. Poey counts $1\frac{1}{2}$ + 4 rings under the dorsal. This species is close to the European *Siphostoma pelagicum*, but the latter is more slender, with longer snout and longer head, $6\frac{4}{5}$ to $7\frac{1}{4}$ in length to base of caudal. The European *Siphostoma agassizi* is also closely related, but that species is stouter than *S. rousseau*, with shorter snout.

MURÆNIDÆ.

11. **Gymnothorax funebris** (Ranzani).

A young specimen.

12. **Echidna catenata** (Bloch).

Several young specimens in good condition.

MUGILIDÆ.

13. **Mugil curema** Cuv. & Val.

Common.

14. **Querimana gyrans** Jordan & Gilbert.

Several specimens about $1\frac{1}{2}$ inches in length. Teeth in upper jaw comparatively strong; apparently no teeth in the lower. Anal rays II, 9 or II, 10, not II, 7 or 8, as counted in the original types.

SPHYRÆNIDÆ.

15. **Sphyræna guaguanche** (Cuv. & Val.

POLYNEMIDÆ.

16. **Polydactylus virginicus** (L.)

SCOMBRIDÆ.

17. **Auxis thazard** (Lacépède).
18. **Scomberomorus cavalla** (Cuvier).

CARANGIDÆ.

19. **Oligoplites saurus** (Bloch & Schneider).
20. **Chloroscombrus chrysurus** (L.).
21. **Trachurops crumenophthalmus** (Bloch).
22. **Caranx latus** Agassiz.
23. **Vomer setipinnis** (Mitchell).
24. **Selene vomer** (L.).
25. **Trachinotus falcatus** (L.).
    (*Trachynotus ovatus* authors.)

HOLOCENTRIDÆ.

26. **Holocentrus ascensionis** (Osbeck).

SERRANIDÆ.

27. **Rypticus saponaceus** (L.).
28. **Bodianus cruentatus** (Lacépède).
29. **Mycteroperca venenosa guttata** (Bloch).

SPARIDÆ.

30. **Lutjanus jocu** (Bloch & Schneider).
31. **Lutjanus caxis** (Bloch & Schneider).
32. **Lutjanus synagris** (L.).
33. **Lutjanus analis** (Cuv. & Val.).
34. **Lutjanus vivanus** (Cuv. & Val.).
    (*Lutjanus profundus* Poey).
35. **Lutjanus buccanella** (Cuv. and Val.).
36. **Hæmulon parra** (Desmarest).
    (*Hæmulon acutum* Poey).
37. **Hæmulon plumieri** (Lacépède).
38. **Hæmulon flavolineatum** (Desmarest).
39. **Hæmulon schranki** Agassiz.
    (*Hæmulon steindachneri* Jordan & Gilbert.)

    Not before taken north of Brazil.

40. **Hæmulon chrysargyreum** Günther.
41. **Hæmulon aurolineatum** (Cuv. & Val.).
42. **Hæmulon striatum** (L.).
    (*Hæmulon quadrilineatum* Cuv. & Val.)
43. **Conodon nobilis** (L.).
44. **Calamus bajonado** (Bloch & Schneider).

MULLIDÆ.

45. **Upeneus maculatus** (Bloch).

SCIÆNIDÆ.

46. **Larimus breviceps** Cuv. & Val.
47. **Odontoscion dentex** (Cuv. & Val.).
48. **Corvula sanctæ-luciæ** sp. nov. (Type, No. 41732, U. S. N. M.).

Allied to *Corvula subæqualis* (Poey), but with a larger mouth, shorter pectoral, and different coloration.

Head, 3¼ in length; depth, 3⅙; D. XI–I, 23 : A. II, 8; scales, 6–46–10. Length of type, 5¾ inches.

Body oblong, moderately compressed, the back moderately elevated. Head rather short and blunt, the anterior profile uniform, and slightly arched. Snout short, shorter than eye, 4¾ in head. Eye large, 3⅗ in head, a little greater than interorbital space. Mouth considerably oblique, the jaws equal, the premaxillary in front on the level of lower part of pupil, the maxillary extending to beyond line of middle of pupil, 2⅓ in head; teeth of upper jaw in a narrow band, the outer moderately enlarged; teeth of lower jaw moderate, not quite equal, almost in one series; preopercle with its membranous edge finely dentate; gill rakers long and slender, about x + 15. Scales large and firm, those above lateral line anteriorly in series parallel with the lateral line; at a point below last dorsal rays each series is suddenly bent upward, and then again becomes horizontal. Rows of scales below lateral line horizontal and nearly straight. Dorsal spines slender; soft dorsal and anal scaly at base; caudal (broken) apparently subtruncate; pectoral very short, in head, reaching about to eighth dorsal spine; anal small, inserted backward, its second spine moderate. Disstance from insertion of ventral to first anal spine one and one-fifth times depth of body. Coloration silvery, with about fourteen horizontal dark stripes, as in some other species of *Corvula* and *Larimus*. These stripes are continuous, and those above bend upward underneath last dorsal spines; fins pale yellowish, all more or less soiled with dark points; a faint dark axillary spot; lining of gill cavity pale.

One specimen, from St. Lucia.

49. **Umbrina broussoneti** (Cuv. and Val.)
50. **Micropogon fournieri** (Desmarest.)

GERRIDÆ.

51. **Gerres olisthostoma** Goode & Bean.
52. **Gerres rhombeus** Cuv. & Val.
53. **Gerres gula** Cuv. & Val.
54. **Gerres pseudogula** (Poey.)

Very close to the Florida species, *Gerres harengulus*, but a little more slender, and with rather weaker anal spines. In the paper on this genus by Evermann and Meek (Proc. Ac. Nat. Sci., Phila., 1886, 261), *Gerres harengulus*, as represented by specimens from Florida and Cuba, was referred to the synonymy of the west coast *Gerres gracilis*. The two species are very closely related. A comparison of specimens show that *G. harengulus* has a blunter snout, somewhat larger eye, and larger anal spines than *G. gracilis*. Eye, $2\frac{4}{5}$ in head; snout, $\frac{3}{4}$; second anal spine, $2\frac{2}{3}$ to $3\frac{1}{3}$ in head in *G. harengulus* from Key West; ($3\frac{1}{4}$, $3\frac{1}{4}$, $4\frac{1}{2}$ in *G. gracilis* from Guaymas). It is, however, not always possible to distinguish *G. harengulus*, *G. pseudogula*, *G. gracilis* and *G. dowi*, and perhaps all should be regarded as varieties of one, *G. gracilis*.

EPHIPPIDÆ.

55. **Chætodipterus faber** (L.)

CHÆTODONTIDÆ.

56. **Chætodon striatus** Bloch.
57. **Chætodon ocellatus** Bloch.
58. **Chætodon sedentarius** Poey.
59. **Chætodon capistratus** L.
60. **Holacanthus tricolor** (Bloch).

ACANTHURIDÆ.

61. **Acanthurus hepatus** (L.)
62. **Acanthurus bahianus** Castelman.
    (*Acanthurus tractus* Poey.)
63. **Acanthurus cœruleus** (Bloch & Schneider.)

LABRIDÆ.

64. **Halichœres maculipinna** (Müller & Troschel.)
65. **Halichœres bivittatus** (Bloch).
66. **Platyglossus dimidiatus** (Agassiz).
67. **Sparisoma flavescens** (Bloch & Schneider).
68. **Sparisoma abildgaardi** (Bloch).
69. **Sparisoma aurofrenatum** (Cuv. & Val.).
70. **Sparisoma hoplomystax** (Cope).
    (*S. cyanolene* Jordan & Swain.)

Abundant, as is also the next species. The fact of the wide distribution of these two species is an interesting one, as until very lately both have been overlooked or else not intelligibly described.

71. **Sparisoma xystrodon** Jordan & Swain.
72. **Scarus cœruleus** (Bloch).
73. **Scarus croicensis** (Bloch).

One young specimen.

74. **Scarus acutus** Poey.

One specimen. In spirits, dark above, with a paler area extending from pectorals to base of caudal. Caudal subtruncate, with the angles slightly produced. No posterior canines. Scales on cheek in four rows, those of the first row largest, the third row with six or seven scales; body rather elongate, the depth $3\frac{3}{5}$ in length; snout comparatively sharp, $2\frac{3}{4}$ in length of head; eye small.

MALACANTHIDÆ.

75. **Malacanthus plumieri** (Bloch).

GOBIIDÆ.

76. **Gobius soporator** Cuv. & Val.

SCORPÆNIDÆ.

77. **Scorpæna plumieri** Bloch.
78. **Scorpæna grandicornis** Cuv. & Val.

DACTYLOSCOPIDÆ.

79. **Dactyloscopus tridigitatus** Gill.

Dactyloscopus poeyi Gill (Proc. Ac. Nat. Sci., Phila., 1861, 266) seems to be the same species.

PLEURONECTIDÆ.

80. **Syacium micrurum** Ranzani.
81. **Platophrys lunatus** (L.).
82. **Symphurus pusillus** (Goode & Bean).

Depth, 3 in length; scales, 88. Dark gray, with very obscure brown cross-bands. Fins, including caudal, pale, with dusky blotches at short intervals. This specimen is identical with the one taken by Dr. O. P. Jenkins at Beaufort, North Carolina, mentioned by Jordan and Goss, Review Pleuron., p. 326. It is decidedly different from the common *S. plagusia* of the West Indies, and seems to be specifically distinct from *S. plagiusa.* I may here note that the appearance of "keeled scales" on *Symphurus nebulosus* (Goode & Bean) is due to a black line on the skin under the center of each row of scales. There seems to be no real keel and the species is congeneric with the other species of *Symphurus.*

BALISTIDÆ.

83. **Monacanthus pullus** (Ranzani).

TETRAODONTIDÆ.

84. **Spheroides testudineus** (L.).

DIODONTIDÆ.

85. **Diodon hystrix** L.

OSTRACIIDÆ.

86. Ostracion bicaudale L.

ANTENNARIIDÆ.

87. Antennarius scaber (Cuvier).

One small specimen. Body light brown, clouded with darker. Fins all with round black spots, those at the base of the dorsal somewhat larger than others. Ventrals tipped with black.

UNIVERSITY OF INDIANA, *December* 11, 1889.

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